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Smithsonian

Colonial travel (p. 62) was enough to shake "liver and lungs out of you. . . ."

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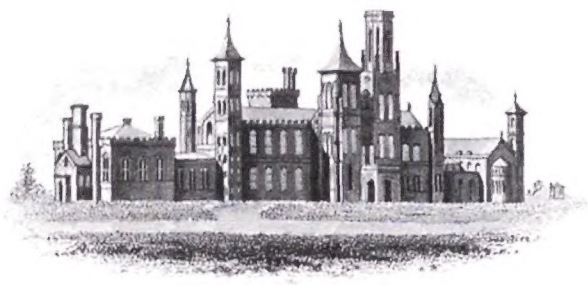
The view from the castle



The cycle of life goes on in our duck ponds,
where the predators may be outwitted
for a while—until a new one comes along

After sunset, these fall evenings, there is a time of twilight on the ponds when the senses are quickened as the light fails. Hearing sharpens, one smells more keenly, the eyes seem to adjust to reduced light reflection even as pools of darkness gather between the trees. I used to love this time on our duck ponds, for then imagination wakens and one senses again the life of the hunter. But now our feelings are mixed with dread, for a new predator has been added to the roster of mink, raccoon, fox and stray dog that our fences guard against.

Beyond the first ponds is a bench, and here I can sit and watch in the gloaming. Ducks and geese coursing over the water leave behind a variety of v-shaped ripples and deliquescing colors, pinks to reds to mauves to purples. Some v's are narrow—a single wood duck on an errand of its own; others are a series of expanding trails—a family group of small geese, sailing effortlessly in line. Two larger geese junket by, tails higher, necks lower, sleepily pushing along.

But suddenly the spell is broken, drowsiness is gone. We are alert, all of us. Why? No sound, no smell, but distant motion—or is it? It's hard to tell; birds are all on the water now, all looking in one direction, beginning a slow drifting movement, as if mesmerized. At the end of the pond there is a big boulder sticking out of the water, gray against the limpid purple. And, yes, there's a shape on top, quite still—no darting mink or deliberate raccoon, just still and tall. It can only be a great owl, silent, motionless, come on velvet wings like a wraith. I dare not move, for the owl's eyes are five to ten times more light-receptive than my own.

The ducks and geese seem riveted on the owl, as I am. Like some cloaked Mephistophelian figure the predator decoys his prey, for they are drifting toward the boulder, seemingly spellbound. The owl does not move. I cannot see if it even blinks. As we all watch, a blurred movement comes from behind. Without a sound a second owl sweeps low over the water, strikes with outstretched feet at a duck, and glides away, its talons locked in the back of the helpless bird.

It is over in an instant and I am powerless. With cries of alarm, ducks and geese dart in all directions in panic. The hypnotist flies off to join its mate, and I can only marvel at the drama which has deprived us of one of our small supply of breeding canvasback ducks. From being very uncommon a generation ago, great horned owls have become locally more visible on the East Coast, perhaps because with the spread of the suburbs have come untended woodland, town dumps and a plethora of rats and skunks to feed upon. Now our ducks are threatened in a manner that fences cannot cure. The subsiding ripples of the pond seem like wavelets in a mirage as our rare birds disappear—canvasbacks, ring-necks, Hawaiian ducks, teal, all carefully nurtured on our ponds and formerly secure.

The succession of life itself, the changes in the ratio of predator to prey, the ebb and flow of species—all this is a marvel in nature, no matter how painful in the eye of the beholder. Like life itself, change is the only surety. And so who will win? Perhaps the owls will, for their power is great, their adaptability more breathtaking than anyone could know.

S. Dillon Ripley

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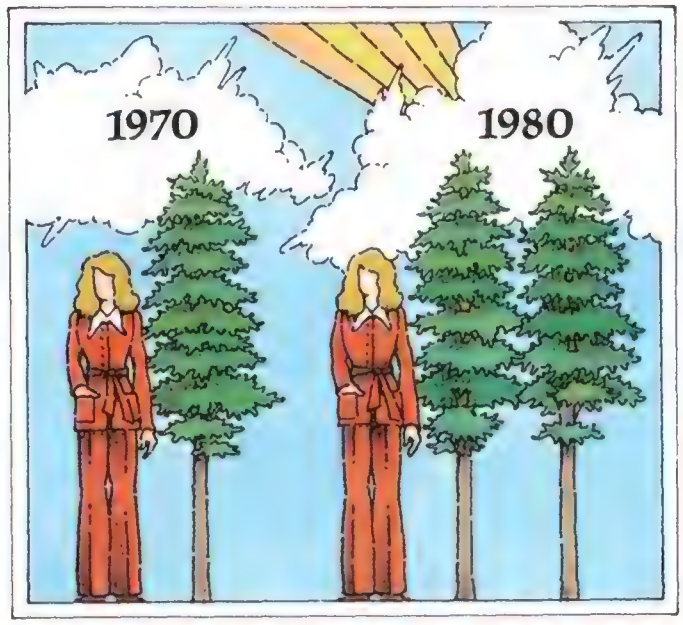

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Phenomena, comment and notes

On fertility in California, misreading the Middle East, monkeys without cavities and baboons with armaments

Man the tool user, as a definition of human uniqueness, has gone by the boards: Nearly everyone knows by now that chimpanzees use tools. Even certain snails use little pebbles in a rather tool-like manner to right themselves when they manage to get flopped.

What about Man the *aggressive* tool user, the maker of weapons? Too bad. Chimps have been found doing this too, chucking branches at unwelcome intruders. But only chimps and humans were thought to take up arms.

One can imagine, then, the delight felt by three investigators from the University of California at Davis when they were able to announce in *Nature* (Volume 256, Number 5517) another instance. Normally, one does not permit delight or any other emotion to emerge from one's prose when writing for a scientific journal—just the facts, please—but apparently the experience was too intense. It is consternation, however, rather than delight, that shows through.

"In the course of a one-year study of three chacma baboon (*Papio ursinus*) troops living on the desert floor of the Kuiseb Canyon in South West Africa we observed numerous instances of stone release directed toward us." Imagine! Well-meaning biologists being stoned by the subject of their inquiry.

It's not really all that fierce, as it turns out. The baboons, first of all, have to be

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chased up a cliff; they have to know their pursuers only slightly (complete strangers and familiar observers are apparently immune); and what they really do is drop the stones over the cliff—even if the pursuer happens to be standing *above* them. Also, the baboons only throw underhand, which can be okay for making the play at second base, but they'll never make outfielders out of them.

Left, right, right, left . . .

Matters in the Middle East always seem to be changing direction and, it turns out, there is a very good reason for it, but one that diplomats may well not have suspected: reading.

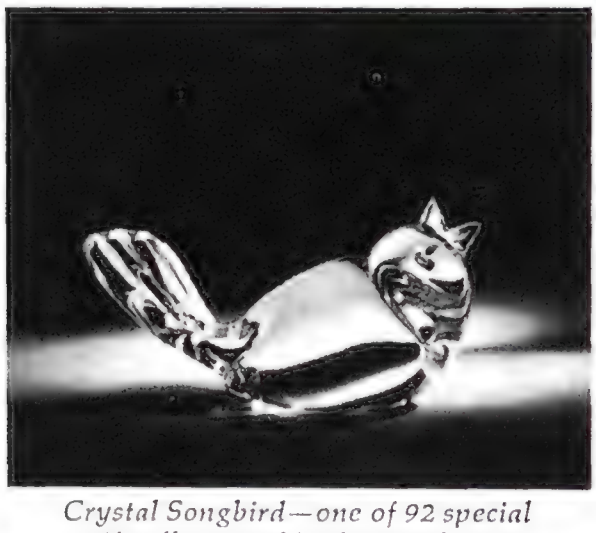
Native Israelis often confuse left and right, discovered Martin Albert of the Hadassah University Hospital in Jerusalem. Of 200 native Israelis who were asked to look left, 36 percent looked right. Of 200 non-natives, only three percent blew it. Arab students did even worse, with 42.5 percent making an error on this simple task.

It all has to do with the two hemispheres of the brain, in the opinion of Dr. Albert. When you read these lines the right side of your brain commands your eyes to move to the beginning of each line, while the left side of your brain is ready to receive whatever information they convey.

But Arabs and Israelis read from right to left and use the left side of the brain for both tasks—to make the eyes move right to the beginning of each line and to receive the information. Thus, according to *New Scientist* (Volume 67, Number 92), it takes longer for these native Middle Easterners to "integrate verbal and spatial material," leading to the errors.

A Danish option

In Denmark, a physicist named Bent Sorenson has taken the plunge into energy economics. According to *Science News* (Volume 108, Number 7), he found that it isn't necessarily true that a growing Gross National Product places more benefits in the hands of society. In other words, to keep the GNP growing you have to pump more and more of it back into the structure. Also, Sorenson found, the GNP does not grow in direct proportion to energy growth. So, he concludes, we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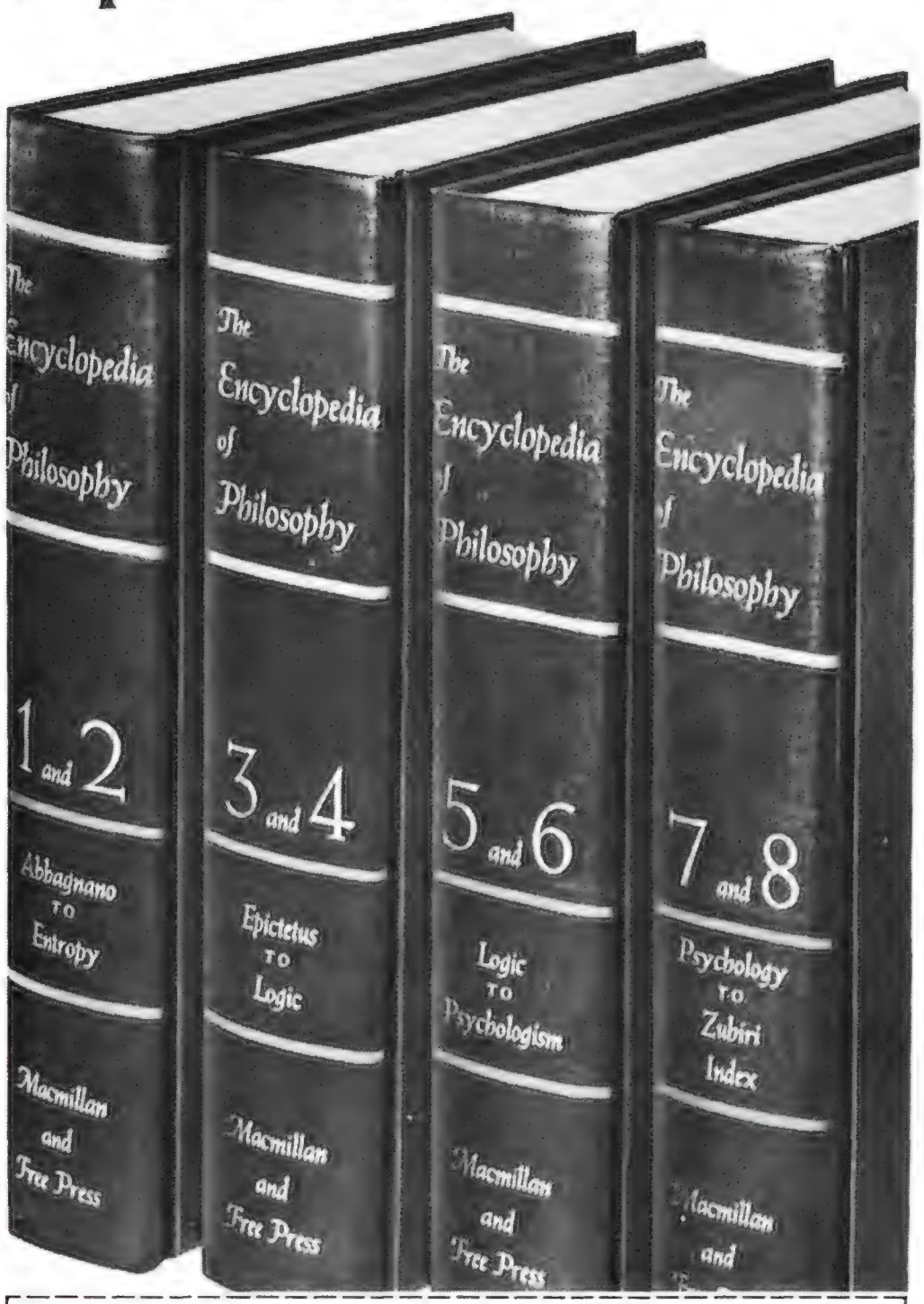

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should develop those energy sources that place the greatest amount of the GNP at the disposal of the people.

His application of all this theory is a recommendation that Denmark turn to windmills to make electricity, a more decentralized mode, which he calculates would produce cheaper electricity in the long run and employ a lot of people in the bargain. Something, therefore, may be rotating in the state of Denmark before long.

Fighting the good fight

In the temperate zone (which the tropics-loving naturalist, Marston Bates, used to refer to as the intemperate zone), the vegetable garden has by now come to an end, except maybe for a few straggling parsnips. Which means, of course, that it is time to start thinking about next year's garden, next year's war against insects and slugs.

And for that war an attractive strategy is to be found in *The Living Garden,* a calendar for 1976 published by two Washington based organizations, Concern, Inc. and the Mid-Atlantic Audubon Naturalist Society. It explains when to do what against which pest, preferring natural weaponry such as chameleons among the house plants to round up mealybugs, and marigold roots to drive off nematodes.

As for chemical weapons, the calendar treats them as one hopes military strategists treat nuclear weapons—as a most unfortunate last resort.

Taking off the brakes

Proponents of a no-growth society have taken some satisfaction from the fact that the United States birthrate has been dropping off since the 1960s, but they may now have to go back to the drawing board and amend their utopian timetable. That is, if California is any kind of bellwether, and two demographers, June Sklar of the University of California at Berkeley and Beth Berkey of the California State Department of Health, believe it is.

Writing in *Science* (Volume 189, Number 4204), they suggest that much of the decline in fertility among married women from the mid-Sixties to last year was attributable not so much to a determination not to have children as to the desire to postpone the time for having them. "Most

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women," they say, "including those under 30, want and expect to have families of at least two children." This was the case even in the years of low birthrate. From 1966 to 1974, wives between the ages 25 and 34 were the only group to show an increased fertility.

In that same period, birthrates of wives aged 20 to 24 tumbled by 34 percent, but in 1974, the rate in the same age group climbed by three percent.

Adducing such figures not only for California but for several other states, they suggest that "the American birthrate may have bottomed out and that the country is likely to see a rise in reproduction."

Cavity-free monkeys

It may be possible before long to put to rest the nagging questions that some people harbor over the fluoridation of water as a preventive of dental caries. The question may become irrelevant and the process unnecessary.

The potential solution has arisen through the work of several researchers at London's Royal College of Surgeons who have been working on monkey teeth.

It has long been known that dental caries is caused by bacteria, specifically *Streptococcus mutans,* which produces acids by fermenting the carbohydrates one eats. Working on the immunological premise that one should fight fire with fire, the researchers innoculated monkeys with fragments of *S. mutans* cells for a period of more than three years and then fed them a high sucrose diet. According to *Chemical and Engineering News* (Volume 53, Number 32), after five years the monkeys, had they been able to talk, would have said, "Look, Doc, no cavities."

Requiescat in pace

A recent weekend was of such idleness and foul weather that the television set beckoned. From the local program guide, the words "last telecast" leaped out—a phrase of brain-battering finality. Tarzan, after all, lives on in print; the Great Depression lives in the photographs of Dorothea Lange, the prose of Steinbeck; Michelangelo lives in Rome on a ceiling. But when The Medium says "last telecast," it means The End.

It was, locally at least, the end of the reruns of *Gunsmoke.* Matt Dillon gone?

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Brother Timothy's Napa Valley Notebook

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Doc gone? Dodge City—the frontier—*all* gone?

The plot of this last telecast was predictably corny and of little consequence. Violence lurked weakly beneath the story line, a potential outcome, a demon to be overcome (which of course it was and by a mere 60-second appearance by the Marshall, who never raised more than an admonishing finger).

One recalls those early editions, when it was decency that panted beneath the program's violence, when Matt Dillon was merely a good man trying to impose his humane instincts on a townful of cretins. It took him well over a decade but he did it—he civilized a town—while his audience, America, missed the lesson. The big, gentle man in the baggy white jeans applied violence only as appropriate—nicely, in the sense of a carpenter making a tenon joint.

One recalls an early incident when a thoroughly dreadful man brutalized his daughter for about 20 minutes and then tried to sell her into bondage. The last third of the half hour was given over to the Marshall administering to the evildoer the finest beating ever filmed—a thoroughly satisfying business.

Simpleminded of course. We know now that a man who would sell his daughter requires psychiatric help, not a beating. We know that such things as child battery, the extinction of innocent species, and carcinogens in the drinking water are not black and white but gray areas, subject to finer distinctions than were made in Dillon's Dodge City.

So instead, as a television diet, we now have the mindless violence of cardboard cops and vigilantes, the canned laughter of half-wit comedies, the cynical good fellowship of ethnic slurs, and saccharine backwoods melodramas, all topped off with 30-second commercial spots elucidating the lasting verities of the American Revolution.

On television that rainy weekend, Matt Dillon disappeared, apparently forever; Eric Sevareid, the Electronic Age's answer to the village elder, discussed fishing and the proposition that television "makes us what we are"; and it all ended with approximately nine tons of plastic-encased human meat bashing itself into idiocy while a voice named Howard Cosell burbled approvingly.

So long, Marshall Dillon.

JAMES K. PAGE JR.

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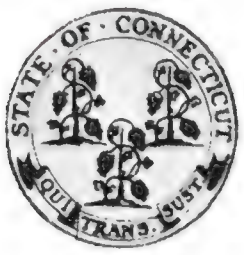

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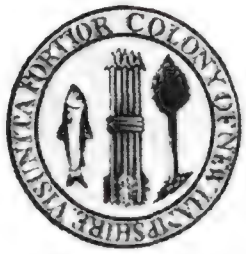

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Letters to the Editor

Urban centers

Dear Sir: As a visiting English architect/planner I read with interest Peirce Lewis' article on reviving urban downtowns. However, as the author points out, it is not at all certain that the designation of sacrosanct areas for historic preservation on a massive scale is either an adequate or satisfactory technique in practice. It is in fact the very development of cities which has given us the Royal Crescent in Bath, Medici's Florence, Edinburgh New Town and the squares of London and the IDS Center in Minneapolis. Shouldn't any policy for conservation, then, provide not for total preservation but for growth and change to occur?

Rather, the attraction of these areas is, I believe, not only that they are of historic or architectural significance but that they are also centered around areas which are varied, small-scale and often predominantly pedestrian, accommodate a mix of uses, are urban, sheltered and intricate.

Preserving—or as Webster's defines it "to can, pickle or the like"—extensive sections of our cities would seem to be an overreaction to this lack of richness in many recent city development projects and it is likely to have the effect of merely fossilizing the city into another component of the nostalgia industry. Instead, surely city planners, administrators, architects and entrepreneurs, together with the public, must now devise and design much improved and far more sensitive infill and additions to the city fabric which show respect for their settings—whether historic downtowns or elsewhere.

Brian Carter
London, England

Dear Sir: Peirce Lewis' quizzical but undismayed look at the future of American cities is a most illuminating, concise statement on urban preservation.

As I read "Fortunately for the old Quarter, New Orleans had gone through a long economic eclipse after the Civil War, and there was little reason to tear down the colonial buildings," I wondered whether Mr. Lewis meant his readers to infer that the present recession may be a goldless opportunity for preservation. If national poverty inhibits our wrecking the *tout ensemble*, can wise use of community development moneys enhance it?
T. H. Littlefield
Albany, New York

Dear Sir: It was nice to note Savannah rated one word in Peirce Lewis' article.

With a metropolitan population of only 250,000, Savannah is, indeed, a smaller city, but the National Historic Area, the 18th-century city, which is the downtown area, covers some 1,500 acres; what other, larger cities have such an extensive historic area? Further, Savannah's historic preservation district is now reclaiming rundown housing in the 19th-century area, south of the downtown area, building a showcase riverfront and a revitalized central shopping area. That should merit more than one word.
Richard-Louis Grosse
Savannah, Georgia

Dear Sir: The article by Peirce Lewis about reviving urban downtowns focuses on areas adjacent to the central city, but just as important is the sustenance of the *genius loci*, or sense of place or community in outlying urban or suburban areas.

We should recognize the reality of today's dispersal of people and their day-to-day activities, and make an effort to establish a sense of community at a number of *loci* within a metropolitan region. Providing a focus for human interest and interaction, which Mr. Lewis so rightly prescribes for historic areas adjacent to old downtown areas, in several places would restore the nearly lost sense of belonging to a community.

The city and entire region should have a dispersed and shared business and residential tax base to carry the load in the common interest.
Alan L. Foster
Denver, Colorado

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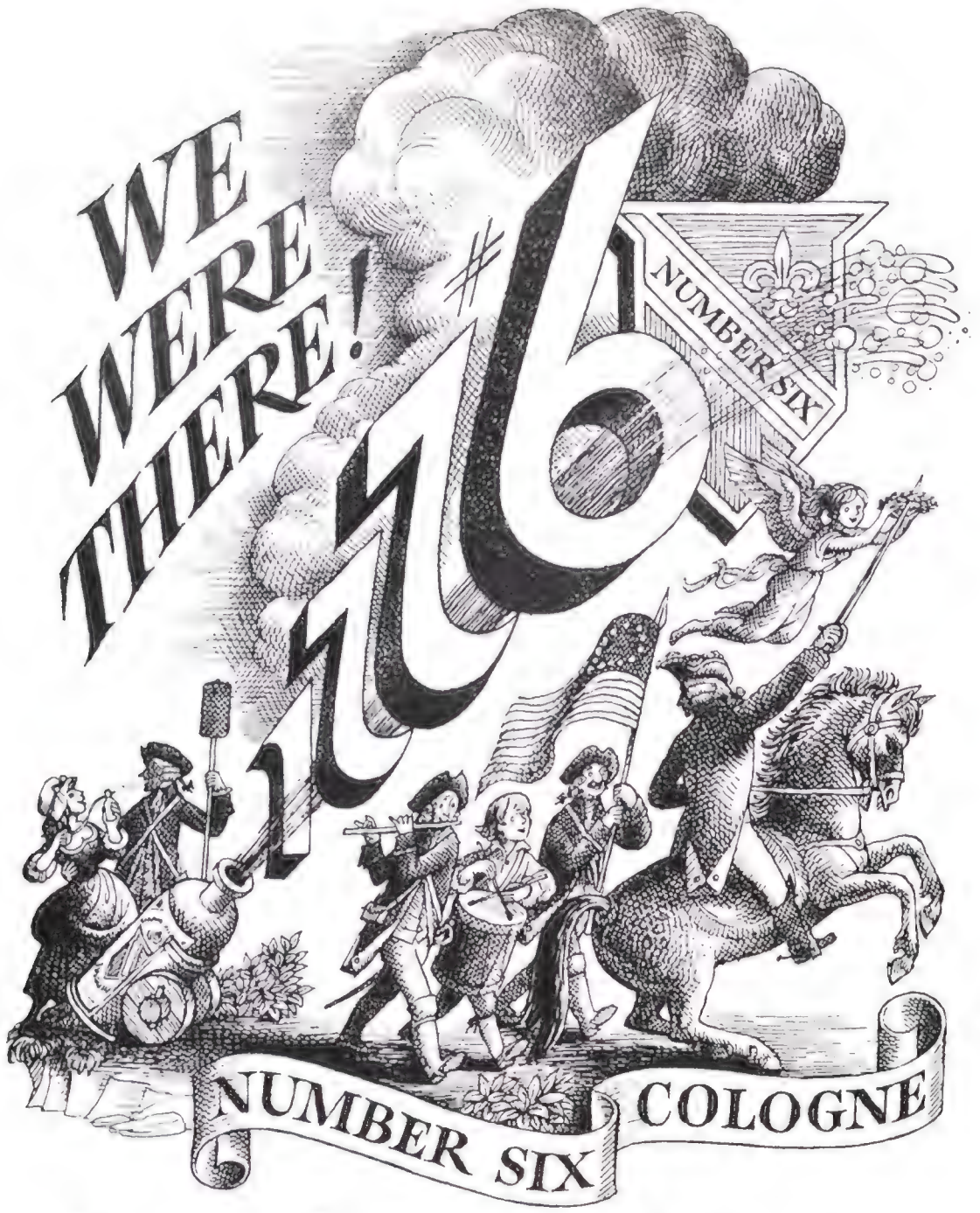

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Davenport's Arabians

Dear Sir: Anthony Amaral's article was not only interesting, but one of the best pieces of writing I have come across in a long time—perfectly fascinating. There is only one part that is slightly in error and this in no way detracts from the story.

When Davenport came to Oyster Bay, as you described it, he spent the day with the President and then my father, to whom you referred, who was the President's secretary and close adviser and confidant over the years, drove him from Sagamore Hill to the railroad station. As they sat in the rig in front of the station waiting for the train to be made ready to depart, Davenport was still puzzling over what should be the theme of his cartoon in support of the President; he discussed his inability to get a hold on the situation and my father interjected, as we have often seen people do, "Well, anyhow, he's good enough for me."

In a flash Davenport said, "That's it!" and right then and there he created in his mind that great cartoon of his which did so much to reelect Roosevelt. It was the cartoon showing the President with Uncle Sam behind him with his hand on the President's shoulder and the caption was, "He's good enough for me."

Except for the primitive medical aspects of those days, it would be nice to have them back again.

William Loeb
President
Manchester Union Leader

Dear Sir: Homer Davenport had been a country boy on the Oregon farm where I was a next-generation country boy. That was why he rode all the way around its many acres on the noblest of the now-famous steeds he had just brought back from Arabia. Because he needed a gate-opener, I trotted alongside his right stirrup, breathing hard to keep up with him and with the burnoosed Bedouin stableboy deeded over to him with that stallion of stallions. Behind us trailed livery stable surreys from nearby Silverton laden with Eastern newspaper men, among them Hearst's editor, Arthur Brisbane. Burly and ruddied by the Arabian sun, Davenport wistfully lamented leaving this farm, "the most beautiful farm anybody ever saw." But he advised me to look otherwheres too, as he had done, if a deep ambition urged. From that memorable day

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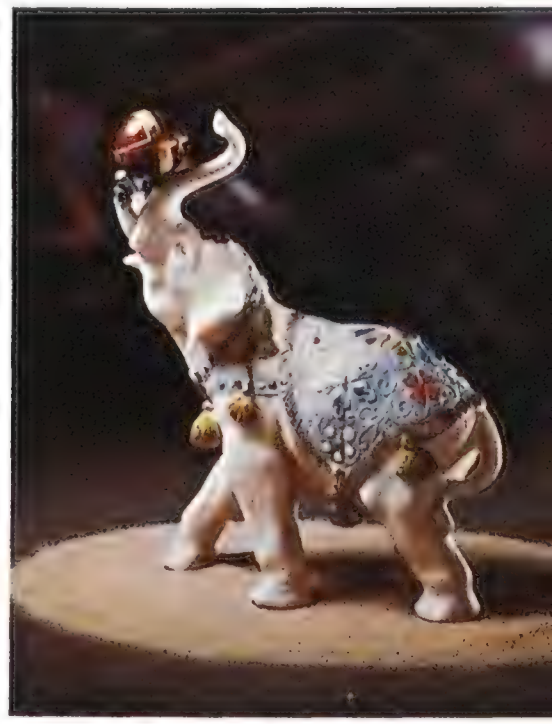
Barnaby

Bosun



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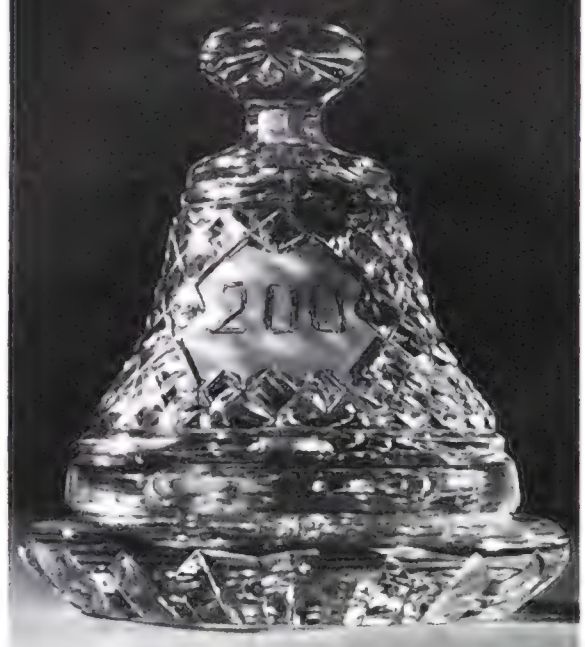

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it did, leading me off by way of Reed College, Harvard and an Oxford Rhodes Scholarship. Your splendid account of the Davenport strain of Arab horses brought back that day of days.

Loyd Haberly
Vero Beach, Florida

Red River Gorge

Dear Sir: Your September article on the Army Corps of Engineers versus the Red River Gorge is another example of bureaucratic self-perpetuation. No doubt the Corps proposed the project to Congress in the first place and now claim they have a mandate to build the dam. Vermont went through the same hassle with our Victory Bog. The Corps finally went away after they could not prove we would be any better off than to leave the bog in its natural state. Keep up the pressure, the Corps can be beaten.

Richard V. deGrasse
Utilities Engineer
Stowe, Vermont

Dear Sir: As a Kentuckian whose love affair with the Red River Gorge has led to many hikes, camp-outs and protest marches, may I express my appreciation for your beautiful article. I am certain that the article will help sway the opinion of many toward the preservation of this magnificent wilderness from the degradation of the bulldozer.

Ann N. Ballard
Harrodsburg, Kentucky

On September 11, Kentucky Governor Julian Carroll stated that "I can find no compelling reason to build the Red River dam. Therefore, I am opposed to the project." Both Senators from Kentucky support the Governor's position. The same day the Army Corps of Engineers recommended to the congressional appropriations committees that "the project not be funded for construction" at this time. Ed.

Mars

Dear Sir: I would like to expand and qualify the theory in William Hartmann's article that decreasing temperatures caused the extinction of the reptiles. A remarkable variety of reptiles became extinct in a very short period of time. This is particularly hard to understand if the dinosaurs were warm-blooded. A possible

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PHILLIPS 66

The Performance Company

Illustrated: Pintail drake and gray duck decoys in the collection of Charles W. Frank Jr., collector, carver and author of *Louisiana Duck Decoys.*

don carbs

explanation is that the primary effect of the cooler climate was on the eggs, rather than on the adult forms.

The problem of incubating large eggs was similar for forms in which the adult structure and behavior was extraordinarily diverse. The larger the eggs, the more vulnerable they would have been to climatic change.

The birds are feathered reptiles which solved the problem of keeping the eggs at a suitable temperature, but one can hardly imagine *Triceratops* sitting on a nest! Surviving reptiles are either in conditions which have not changed greatly (crocodiles), or are small and have evolved behaviors for incubating small eggs.

Emphasis on the eggs and the problem of incubation helps us understand both why very different forms became extinct and why some reptiles survived.

S. L. Washburn
Department of Anthropology
University of California, Berkeley

View from the Castle

Dear Sir: I enjoyed and agreed with the column relative to the potential educational value of museums. As a one-time college teacher, I have particular interest in the subject.

Unfortunately, this aspect of a museum's function is seldom emphasized, and is little understood by either high school or college teachers. At the same time, museums may also be criticized for not always organizing and arranging exhibits so as to be functionally adaptable to augment classroom activities.

Perhaps these various difficulties could be partially overcome by encouraging school teachers and students to work with museum personnel in organizing exhibits of particular value to the educational community. Such an approach might be fundable from one of the several government agencies interested in education or from private sources. In the case of the colleges it might become a part of a "policy research" course, and thus be student motivated.

By placing the planning and organization of the exhibit in the academic institution, the museum would be partially released from the labor involved, but also from the possible control of any funding agency—the concern of Mr. Ripley.

Jack W. Powers
New York City

Phenomena, comment and notes

Dear Sir: Your self-styled curmudgeon, Mr. Page, strikes a sensitive note in this traveling family when he complains about children under five. We, too, resent it when mismanaged children roam undisciplined and noisy—disrupting better behaved travelers. We resent it as well, however, when we meet up with irascible, choleric, splenetic, testy, touchy, cranky, easily angered adults. Perhaps there ought to be a zone for boorish grown-ups.

Herbert L. Ash
Flower Hill, New York

Dear Sir: In Mr. Page's delightful column, the period of the sun's orbit around the center of our Milky Way galaxy is incorrectly given as 500 million years. The figure currently and most widely accepted is about 250 million years.

Charles G. Barbely
Spacearium Officer
National Air and Space Museum
Smithsonian Institution

Mr. Barbely is correct. Nature, *the original source, corrected the figure in the following issue's "letters to the editor" column and we follow suit.* Ed.

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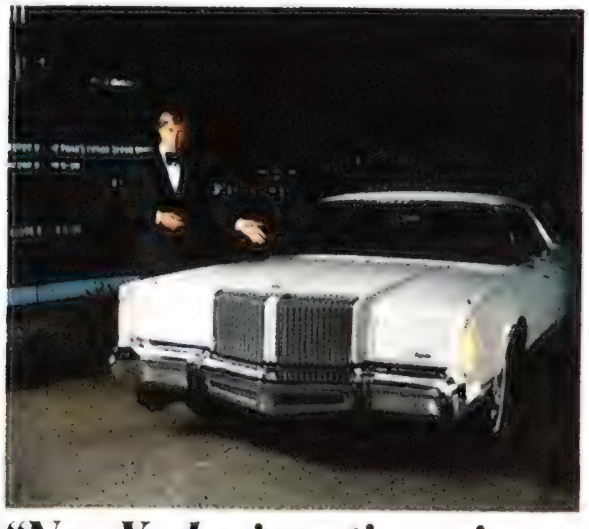

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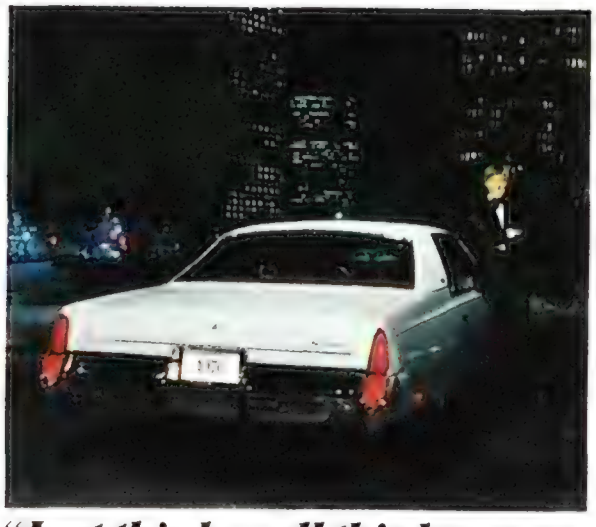

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Around the Mall and beyond

In the hope that I might snuffle out a "Now-It-Can-Be-Told" item, I recently nosed over to the new—as yet unopened—Air and Space Building to talk to Dr. Farouk El-Baz, Research Director of the Smithsonian's Center for Earth and Planetary Studies. He and a scientist from the Smithsonian Astrophysical Observatory in Cambridge were the only two Institution representatives in Houston for last summer's Soviet-American venture, the Apollo-Soyuz linkup.

Dr. El-Baz said that when the mission was first being discussed, the Russians asked whether the Apollo people would be limiting their photographs to shots of the United States while the Soyuz crowd were photographing only the steppes of Russia. No, said the planners, the idea is to have general coverage of the whole world by both teams.

The Soviets thought that over, and then, about six months before the shot was scheduled, they agreed to a general coverage *if* the announcement about it made no mention of photographing the Third World, ever a dicey area to Soviet political gamesmen.

So, according to Dr. El-Baz, the activities of both Apollo and Soyuz up to the time of docking included "Earth Observation." This same activity was carried on *after* the two vehicles split apart. But during the docking, when the two crews wandered back and forth between their linked vehicles in genial companionship, they carried out something known simply as "Orbital Science."

Dr. El-Baz reports that the Russian groundlings seemed even more enslaved by bureaucracy than their American counterparts, but that the cosmonauts

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were fine people, much the same sort as our astronauts. These flight crews got along famously, public relations stories aside. The Russians spoke English pretty well, and two of the three Americans, Thomas Stafford and Vance Brand, had mastered Russian—Stafford to the point of fluency. Only Deke Slayton, the old warhorse of the American program, had the devil of a time with his language problem and limited himself pretty much to *nyet*s and *da*s.

Speaking of space matters, the Skylab flight suit, worn by scientist-astronauts who wheel around up there doing important things, was designed by Raymond Loewy, one of the earliest American industrial designers and certainly one of the greatest and most prolific. Scores of photographs, drawings and models of his brainchildren have been on exhibit at the Renwick Gallery, along with some of the actual articles. They go off view the middle of this month.

The Renwick is a beautiful old Victorian building, gorgeously refurbished and restored, more or less across the street from the White House—and a fitting neighbor to it. I hadn't thought of it as an automobile showroom, but in one of its downstairs display rooms stands a Studebaker Avanti II, that mouth-watering American car still being built on order for those with the exquisite and extravagant taste to want one. It's there, of course, because Raymond Loewy designed it back in the early Sixties. This fall, while the showrooms of Washington are all gleaming with their bright, good smelling, plastic, polluting, gas-burning, overpriced wares, the Renwick has been hanging right in there with its own, elegant, splendid, sophisticated, polluting and gas-burning offering—a 1975 Avanti.

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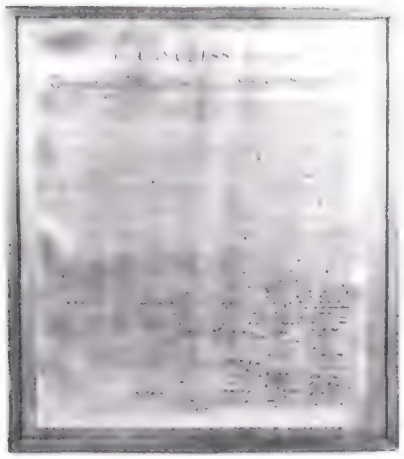

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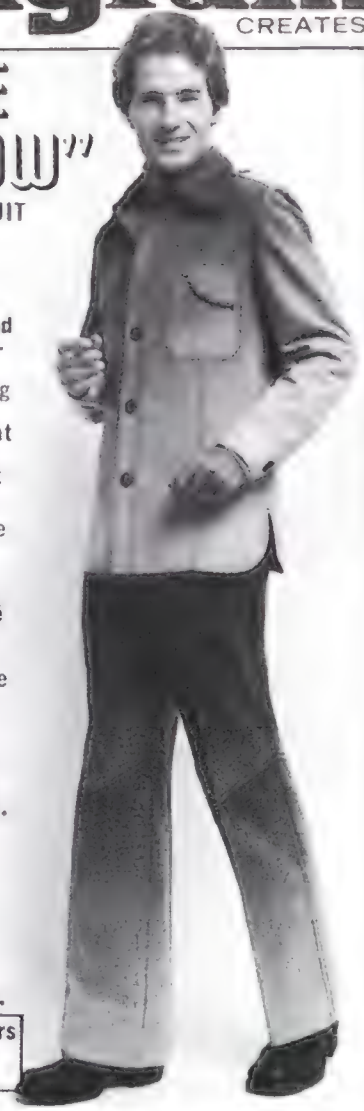

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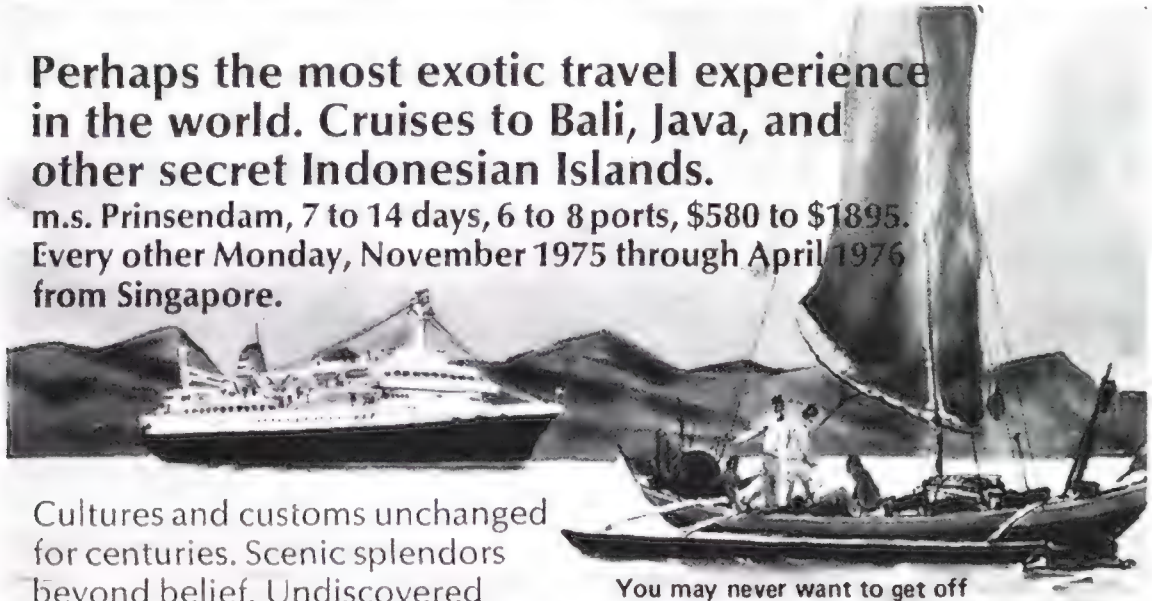

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what the Renwick's administrator, Lloyd Herman, tells me. He may not be entirely trustworthy because he says he finds himself looking with some longing at that showroom model in the Loewy collection and wondering if there's a way to spirit it off to his own garage.

Of course moving the car in and out of this particular showroom requires easing it over on its side to get it through the front door. On the night of the opening of the Loewy display, at the end of July, two other cars—an original Avanti and a Studebaker "Skyliner"—were parked outside the Renwick. Lloyd Herman says that Loewy, like any noted artist, signed one that evening. He reached inside and scrawled his signature on the dashboard.

Upstairs in the Renwick stand two gigantic vases, made in France in 1876 and presented to the Smithsonian as a 100th birthday present to the United States. They are enormous things, richly embellished with flags and wreaths and cannon and wonders of nature, all in heavy and intricate relief.

Perhaps the most interesting thing about these massive creations is how they were built. Arthur Feldman, Associate Curator at the Renwick, received a letter from the Haviland company of New York, which is really a branch of the French outfit that made the things. Apparently the sections of the mold were fitted together, there at Limoges, on tracks leading to a kiln. Comes the big moment and the head molder, *qui s'appelle* Renard, is lowered inside the mold.

bundle up and go

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Since the clay has to harden evenly, with no glob having a chance to dry out before the neighboring glob is applied, *il faut que* Renard stay inside for 34 consecutive hours with nothing longer than a five-minute break every now and then. He presses glob after glob around the inside until *c'est fini* and then he is hauled out. *Pauvre* Renard. *Peut-être* he is given a glass of *vin*.

Anyway, *voilà*, the vases are at the Renwick and will travel back to the old Arts and Industries Building, where they were on display for decades, to play their part in the recapturing of our Centennial, 1876, which is gradually being put together. To our age of miniaturization—all those microscopic electronic circuits in the space machinery, for example—the "hardware" of 1876 seems overpowering in size. There are monstrous steam engines with huge iron flywheels. There are towering display cases made of inlaid wood and broad expanses of plate glass. There are two Civil War cannon which I watched being lowered into position, one 30 tons and one 20. Massive. It was an age of bigness, when people were raised in great gingerbready houses on broad streets in towns that wanted to be cities in a land with inconceivable space.

Bemused as usual, I got thinking about prairie grass, now so scarce as to need preservation in a longed-for national park in Kansas, and that reminded me of the pampas grass of the Argentine which, in this column for September, had so strenuously been withheld from the new South American display at the Museum of Natural History. Just to make sure it finally arrived, I poked my head through the barrier—it has not yet opened at time of writing—and sure enough, there it is, red-brown and coarse and tufty. Mixed with it in the display is something like sagebrush, only darker. It's a fine exhibit, a credit to its designer, Steve Makovenyi.

The grass arrived, apparently, the day we went to press with our note about it. If it hadn't, we would have been rescued by a Pan American stewardess named Ann Ewington who called up soon after publication and said she was on the Buenos Aires flight and if she couldn't finagle a ride for a bunch of pampas grass for the sake of the Smithsonian, she would turn in her drink tray.

Next thing I know, in comes a parcel from the Assistant Director of Astronautics at the Air and Space Museum, Fred-

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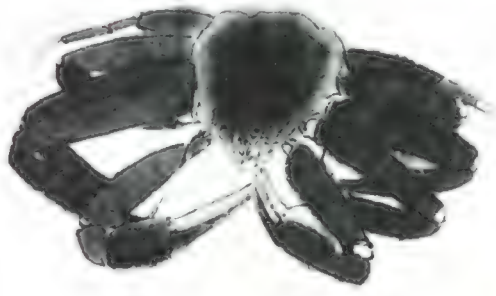
erick C. Durant. It contains a piece of grass—brown and tufted at the end. Also a memo. It seems that the Durants were on their way to Vermont for vacation when they saw a display of "pampas grass" waving in the breeze at a roadside stand near Amherst, Massachusetts.

Pampas grass? In Massachusetts? As my father's friend, Slocum, endlessly reiterated, "New England's got everything you need in this life, and enough snow to take the sting out of hellfiah."

Anyway, we are grateful and touched by such sequels.

Another like it was brought to my attention by our eminent anthropologist, Dr. T. Dale Stewart. Inspired by that Smithsonian television program on monsters, Ms. Darlene F. Fagg of Henderson, Nevada, sent Dr. Stewart a mermaid. It arrived in a cardboard box stamped "poultry" and lay on a bed of cotton—a wizened little thing about 16 inches from head to tail fin. The bottom half of it was fish skin, the top was papier-mâché, and x rays revealed a piece of wood forming a spine and a crosspiece providing shoulders. Dr. Stewart says there were a lot of these things about in circus sideshows and carnivals. P. T. Barnum came up with one that was fabricated from fish and monkey skeletons. At least this one was a little less repulsive than that.

As the summer ended, the summer of the great white shark, the Institution geared up for the visit by Emperor Hirohito, and I attended a showing of Japanese art put together for his delectation.



It was a fine collection, including some nice simple paintings by the Empress (above), but Japanese art is so specialized the western eye (at least *this* western eye) can only handle it in small doses. But I'm kinder about it than one of the Washington news figures who was at the showing. "Great stuff, baby," he remarked to his companion, "but *Jaws* it ain't."

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By Rudolph Chelminski

Baikal survives as a prize for the whole planet

A cellulose plant paradoxically may have saved this extraordinary body of water from the designs of industrial developers

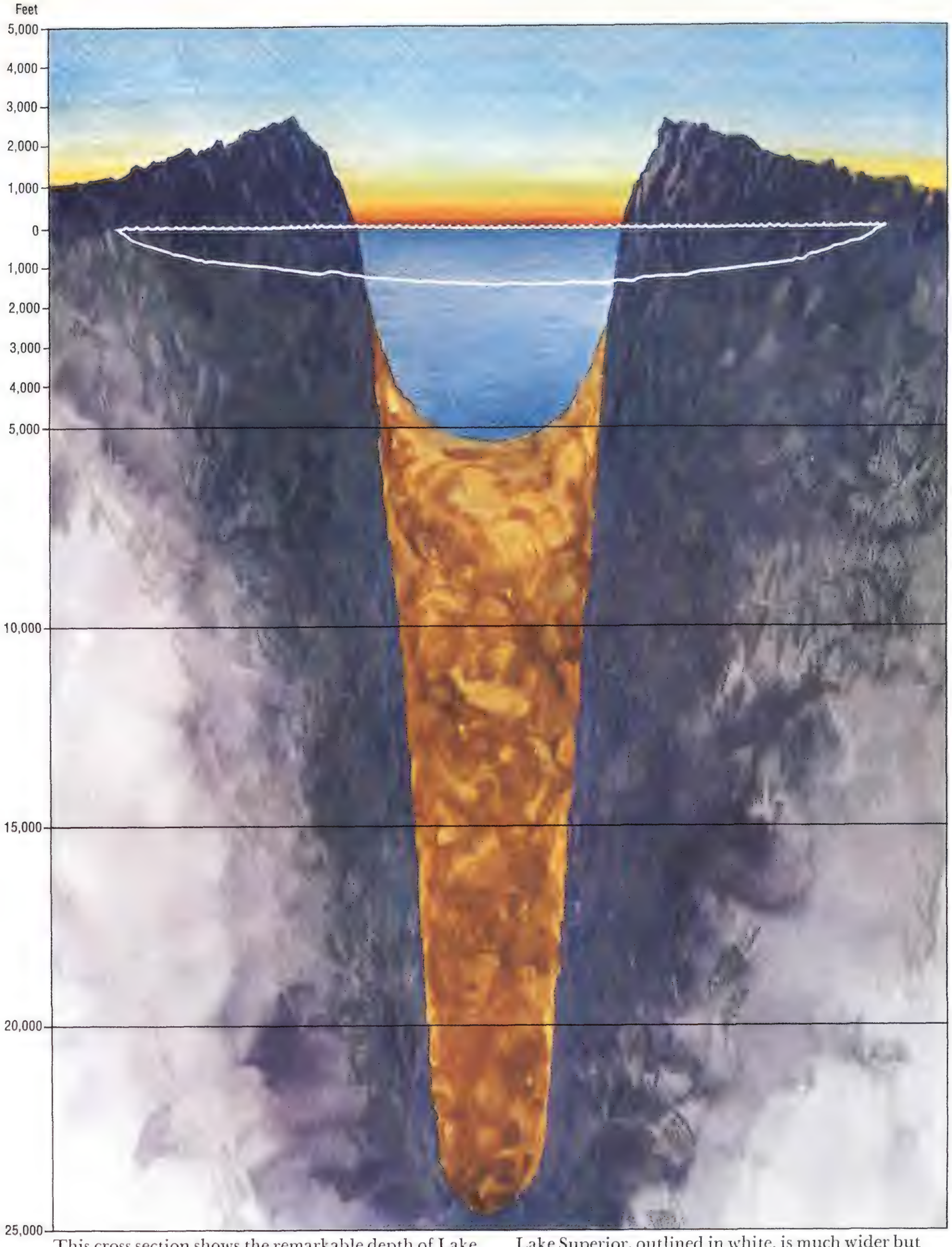
In the middle Fifties, Soviet technicians began searching for a site for a large and modern cellulose plant, theretofore lacking in the USSR. After considering several locations—a high-grade pulp plant needs plenty of water, wood and electricity—they finally selected a forest tract on a body of water in the depths of eastern Siberia, not far from the city of Irkutsk. From the engineering point of view, it was ideal. The body of water was Lake Baikal.

From the moment the choice became official, trouble started, as unexpected as it was vexing: Soviet officials are not accustomed to opposition. The outcry which arose locally soon spread to Moscow, found an echo in the press and became known to the world at large. Still, the plant was considered too important to be delayed by grumblings. Construction began in 1959. Uncharacteristically, though, the controversy continued after this fait accompli, fed by scientists, journalists and artists. The lake, they charged, was being needlessly sacrificed at the altar of industry. Even more uncharacteristically, the planners listened, looked at their blueprints again and added more filtration equipment. When the plant was finished it had what the Soviets now call the most extensive and costly waste filtration apparatus ever installed in a cellulose plant. It stands today as a monument to one of the rare occasions in Soviet history when spontaneous public pressure, however limited and cautious, actually changed the course of events ordained by the central government.

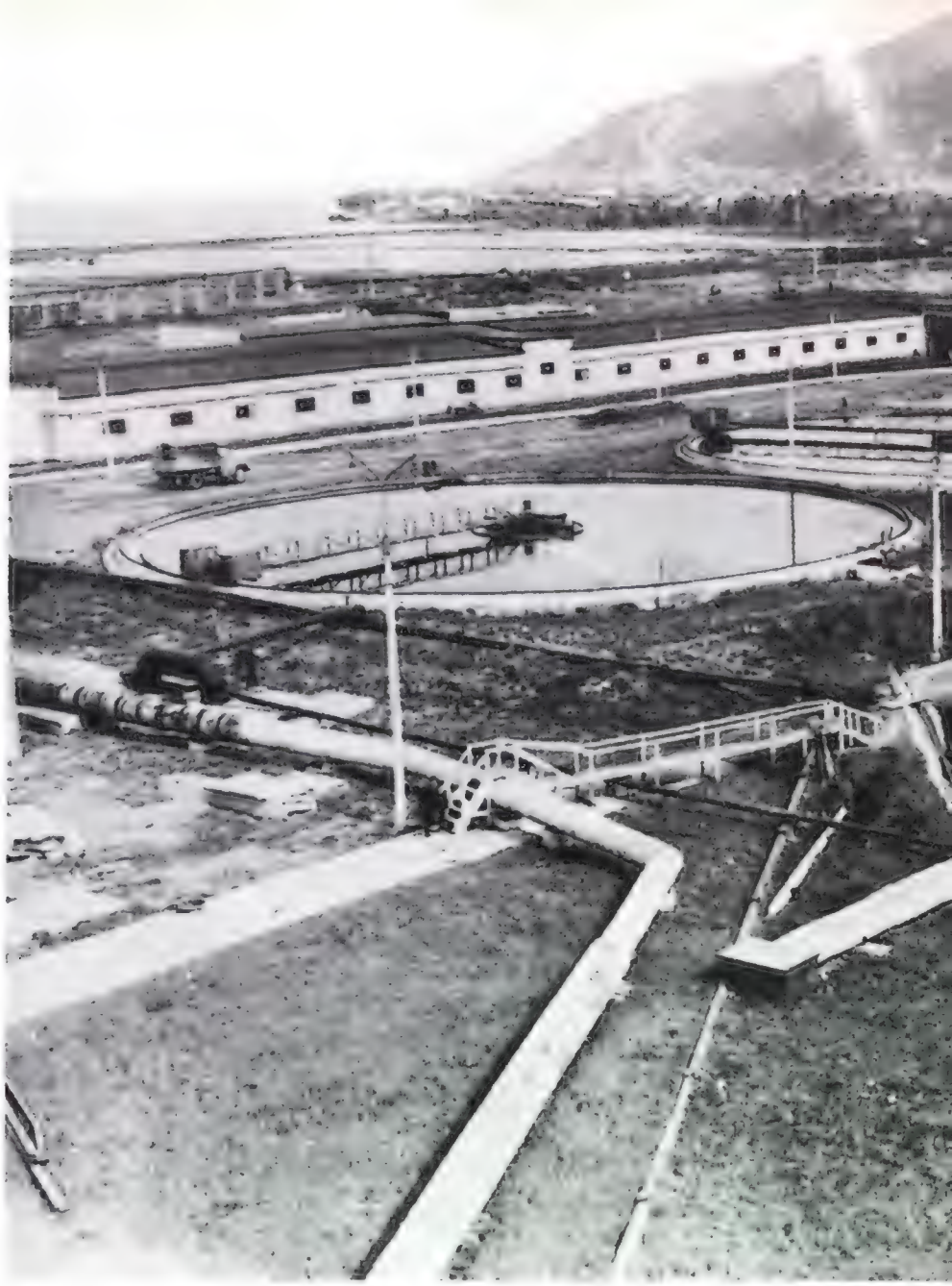
That usually compliant Soviets would stand up and fight for a lake might be surprising if it were any but this one. Lake Baikal is extraordinary. Little-known outside the Soviet Union, mostly because of its isolation and relative inaccessibility, Baikal ranks as one of the great natural wonders of the Earth's physiognomy. To begin with, it is the world's biggest lake, not by surface area but by volume. It is, in fact, by far the largest body of fresh water in the world: The 5,518 cubic miles of water trapped in the Baikal trench represents about one-fifth of our planet's liquid fresh water and a much larger percentage of the Soviet Union's. Baikal's water volume is nearly as great as the Baltic Sea's and is greater than that of all the Great Lakes combined. Its colossal depth (5,314 feet to the lake bottom itself, and then thousands of more feet of sediment) makes for endless superlatives, which Siberians never tire of enumerating: There is five times more water in Baikal than in all of Europe's and Asia's large and middle-sized lakes combined; if all the 336 rivers which feed the lake were blocked and the Angara, its sole outflow, continued its normal flow, 500 years would pass before Baikal went dry.

Because of its remoteness, Baikal did not come under even the most cursory scientific study until the middle of the 18th century, and no systematic, modern

Located along a belt of strong seismic activity in Siberia, Lake Baikal could be the forerunner of a new ocean that will split Asia into two continents.



This cross section shows the remarkable depth of Lake Baikal; the water goes down about a mile and the sediment another four miles beyond that. By contrast, Lake Superior, outlined in white, is much wider but also much shallower. The steep walls of Baikal show it was formed by vertical shifts in the Earth's crust.



This cellulose plant on its shore brought Baikal to Soviet and world attention. The plant has

research was carried out until the latter half of the 19th. The Soviets have naturally continued the work of their czarist predecessors, but they do not hesitate to admit that there is still much to be learned, particularly about the deepest abyssal sections, where no light ever penetrates, where the temperature hovers near 38 degrees the year around (warm compared to the lakeside air temperature, which averages 30 degrees), and where colorless, flabby-bodied mutant sculpins (a kind of bullhead) join tiny, pink-eyed freshwater shrimp to roam over a mournful kingdom of viscous blue mud.

From the very first, though, it was evident that Baikal was a treasure. For one thing, it is one of the world's oldest lakes. Dr. G. I. Galazy, the good-natured giant who directs the Baikal Limnological Institute, dates its present shoreline and bottom configuration to about 25 million years. (Most lakes, including the Great Lakes, have lives measured in mere tens of thousands of years.) The forces that created the lake and the mountains that ring it began 80 million years ago, he says, in the late Mesozoic era, the age of dinosaurs and flying reptiles, when the climate of the area was subtropical. (At about the same time Baikal's mirror-image "sister," Lake Tanganyika, was taking shape in what is now the continent of Africa. It is the second deepest lake in the world.)

Baikal is the center of a tectonic belt running in a line southwest to northeast, and the 30 major earthquakes recorded over the last couple of centuries attest to a permanent instability. In 1861, some 77 square miles of a plain called Gypsy Steppe subsided cataclysmically into the lake, killing 1,300 people and forming a deep new pit now known as Proval Bay.

"Some scientists think that Baikal is the beginning of the formation of a new ocean," Galazy told me, "which is already denominated as the Siberian Sea. The same kind of splitting-apart forces which caused the continental drift in the Atlantic are active here."

Like similarly ancient lakes (Tanganyika and Ohrid are other examples), Baikal holds numerous animal and plant species found nowhere else. Of the lake's 1,700 indigenous species, 1,200 are endemic. Understandably enough, visiting tourists and other nonspecialists are most fascinated by the famous Baikal freshwater seals. Some 60,000 of the silvery-gray *Phoca sibirica,* called *nerpy* in Russian, inhabit the rocky crags at the north of the lake in summer, migrating south with the advancing ice in autumn.

The *nerpy,* Galazy says, came to Baikal 12,000 years ago, following the courses of the Yenisei and the Angara, when the Arctic Ocean reached farther inland than it does now. Direct descendents of the Arctic seals, the *nerpy* adapted so well and so quickly to the lake that they are now considered a new species.

"Their bone structure and biology and speed of

The author, who lives in Paris, most recently appeared in SMITHSONIAN *with articles on Nazi art, electric cars, and Chinese archaeological finds.*

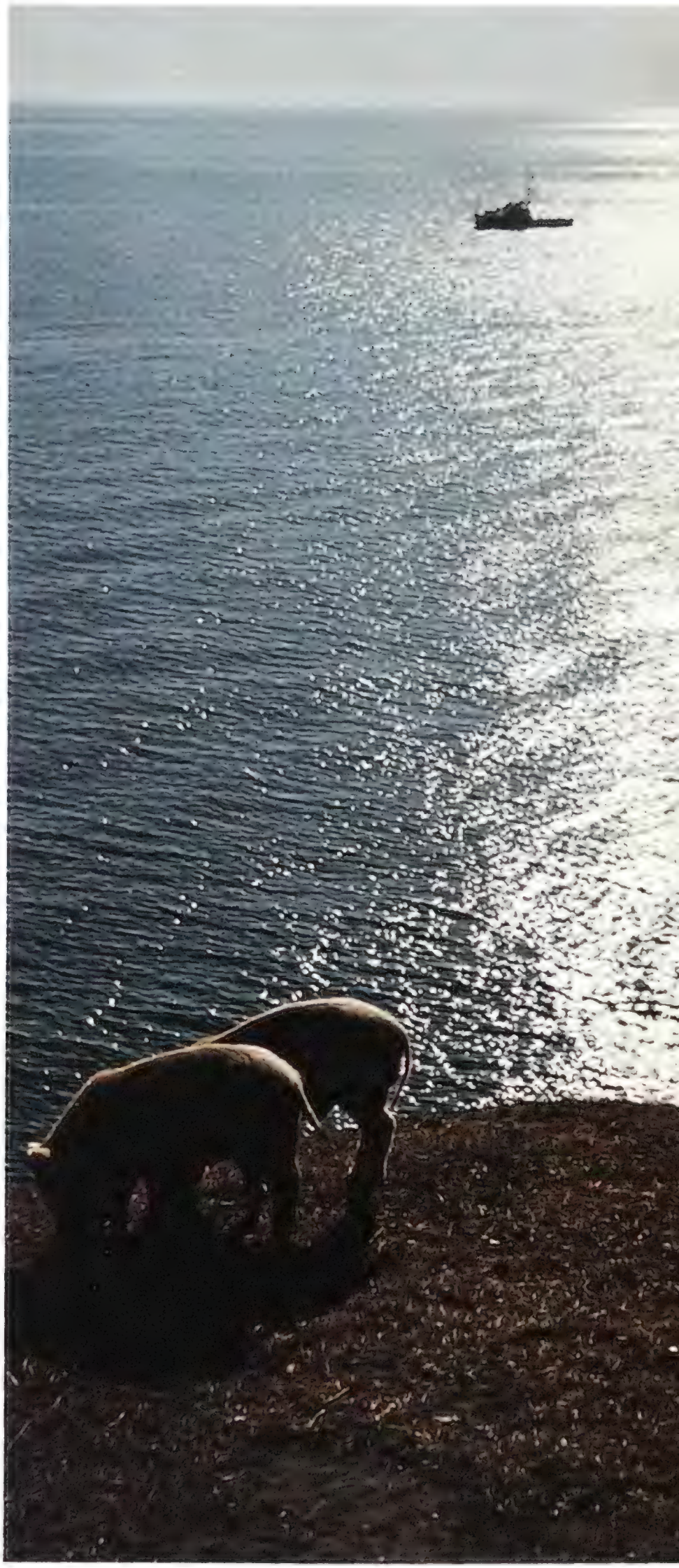
what may be the best filtering system in the world. And it may be the last built on the lake.

growth are different from the Arctic seals," Galazy said. "The color of the fur is different. Whereas the Baikal seal is silvery-gray, the Arctic is yellow with black marks. The *nerpy* have completely changed from what they had been. They are a good example of the creation of a new species in a very short time."

The seals' diet consists almost exclusively of another endemic beast, the weird fish *Comephorus baicalensis,* which Siberians call *golomyanka.* The *golomyanka* is a favorite of Galazy because its highly specialized characteristics prove that it went through considerable evolutionary change to reach its present form.

There is so much fat in a *golomyanka's* body that it is translucent; when taken from the water and held in the sun, it literally melts away to skin and bones in one's hand. It has neither scales nor swim bladder. *Golomyanka* swims from the surface to great depths and then up again without harm. Unlike other fish, the female gives birth to larvae rather than eggs; normally the mother's belly bursts asunder at birth time. If childbirth is painful for most creatures, it is usually fatal for *Comephorus baicalensis.*

Along with the seals came another migrant to



Pigs root for food ashore while a boat moves across the lake, large enough to have oceanic characteristics.

A superlative lake in Siberia

Baikal, *Coregonus autumnalis migratorius,* locally known as *omul,* a salmonlike whitefish which left its ancestors behind in the Arctic to become, along with lake sturgeon, Baikal's most prized delicacy. In all, the lake harbors 50 species of fish, the most numerous being different sorts of sculpin, but also including grayling, whitefish and carp.

Baikal's water is oxygen-rich and astonishingly clear—"practically the cleanest on Earth," Galazy says with pleasure, pointing out that a standard color disc can be seen as much as 44 yards below the surface. Light, and in consequence the algae and plankton it nourishes, penetrates 800 feet or more. One species of microplankton, *Epischura baicalensis,* filters the water down to a depth of 150 feet.

Because of its inordinate size, Baikal is known to natives as "the sea," and the name is more apt than mere folklore. That Baikal has tides is in itself oceanic behavior, and fishermen caught in its storms have described waves more than 15 feet high. Fogbanks, created when a warm front moves over the lake's frigid waters, can last for weeks, making navigation virtually impossible. Like an ocean, Baikal influences the continental climate around it, resulting in a small zone far more temperate than the usually exaggerated Siberian climate. In January, for instance, the air temperature on the shores of the lake is an average of ten degrees warmer than the city of Ulan Ude, 45 miles to the southeast. The lakeside is about seven degrees cooler in summer than such nearby cities as Irkutsk.

Aside from a fishing industry, Baikal remained undisturbed after the arrival in the 17th century of the first Russian colonists in the area. What man has come to call "progress" reached the lake in the waning years of the 19th century, when the steel ribbons of the Trans-Siberian Railway came up against its eastern and western banks, near the southern tip where the land is relatively flat. Only 28 miles separated the two lines, but their junction was to prove the most difficult part of the whole undertaking. To pass around the northern end was patently impossible, because the Stanovoyi Mountains presented a barrier of solid rock. The south was hardly much easier; though the mountains were certainly lower, the loop route was a chaos of crags and ravines that was sure to cost the czar a fortune in bridges, tunnels and escarpments. The decision-makers back in St. Petersburg opted for a ferry. The great, barnlike four-stacker, naturally christened *Baikal,* was launched in 1899 and entered service in 1900. It was the biggest and most frightening man-made thing Siberia had ever seen, but it was virtually helpless against the lake's four-feet thick ice. The behemoth had to be laid up for the winter months; construction began on the southern loop.

Unhappily for the luckless czar, it was not completed in time for the Russo-Japanese War, when Lake Baikal became the scene of one of the strangest engineering triumphs in railroading history. War matériel had to be brought to the beleaguered east at all costs, and the engineers gambled. In February, the coldest month of 1904, they laid track across the ice. When the first test locomotive plunged through the ice and fell hissing and bubbling to the bottom, the engineers improvised a system of supplementary ties—basically, tall cedars stripped of their limbs—placed every 30 feet. This wider distribution of weight enabled trains to pass safely.

Relative anonymity

When the southern loop was completed in late 1904, Lake Baikal returned to relative anonymity and safety from mankind's depredations. Over the years the local fishing cooperatives grew more efficient (to the point that the dwindling schools of *omul* and sturgeon are now protected) and a few small and nonpolluting industries were built.

By 1960, though, the boom in developing Siberia had signaled the end of Baikal's serenity. Because the big new Irkutsk hydroelectric facility could now provide the electricity—the millions of acres of taiga the wood and the lake itself the water—it was inevitable that Gosplan, the Soviet Union's central economic planning commission, would covet the lake for industry. Work began on the Baikal cellulose plant in 1959; it was finished by 1966. Throughout construction and even after completion, the controversy continued.

There were several points to the controversy, according to Leonid Shinkarev, an *Izvestia* correspondent in Irkutsk. "When construction began, the scientists and engineers had not sufficiently studied the lake. Also, no one had any previous experience in the

These picnickers symbolize what Soviet planners hope will become a major use of the lake: recreation.

Hikers move out from a camp on the lake shore. Plans call for hotels, spas and vacation homes there.

design of such plants. The controversy was about unknown quantities.

"At first it was clear-cut—the technicians were for the plant and everyone else was against. But then scientists began examining the project more deeply and came out on both sides of the question. The government considered the various opinions and took some new decisions, about how to build the plant while still preserving the lake. Thanks to the controversy, it allotted more capital for this purpose.

"The debate played a positive role. It caught the attention of the public, of the scientists and of the government planning organizations. Because of the cellulose plant, everyone has begun to pay attention to conservation. Baikal has been a catalyst."

The filter system works very well, apparently—about as well as present technology can devise. The standard public relations stunt is to hand visitors a cup of the water from the plant's outspout. Yes, it is drinkable.

Even so, the filter system can never be perfect. Galazy pointed out that although the water now discharged into Baikal is relatively innocent, it is different, and has already changed the environment in an area of 15 square miles or so. Any changes in water chemistry are bound to affect the microplankton.

Barring the happy prospect of a technological breakthrough in filtration, it appears that Baikal will continue to be affected by the cellulose factory, but in a scope that is, everything considered, limited. What next? Can desirable industrial property like this remain safe in the last quarter of the 20th century?

Back in Moscow, I tried unsuccessfully for nearly a week to meet with any Gosplan official who could speak with authority about Baikal's future, but it became evident that I was asking for too much too fast. I eventually left Moscow, having deposited my questions with APN, the state press agency that handles visiting foreign journalists. A month or so later, I received a written statement. After reviewing much of what I had already learned about filtration, the statement, at its very end, finally addressed itself to the crucial point:

"It would hardly be right to stop utilizing timber resources so abundant in the trans-Baikal area. Only 60 to 65 percent of the calculated timber resources are utilized now. But timbering will be conducted with due account given to lake protection.

"There will be no industrial construction on the shores of Baikal, even the enterprises which are not considered harmful to the environment will not be built there. An industry of quite a different nature will flourish on the lake shores, the industry of recreation. Spas, holiday homes and tourist bases will be built."

Baikal's best vocation is simply to remain as beautiful as it is, to be a base for scientific study and to be visited by tourists from around the world. And in case all this strikes Gosplan as less useful than heavy industry, let them consider Galazy's reasoning.

"Think of it," he said, enthusiastically gesturing at a detail map of the great lake. "Twenty percent of the world's fresh water! And the cleanest and the purest you can find. At a time when Americans and Japanese are seriously talking about towing icebergs to water-poor areas, why not use Baikal to furnish drinking water? The time will come when a water pipeline from Baikal will be more profitable to the state than all the oil pipelines in Siberia."

A research vessel stands in the ice that closes the lake to navigation during the winter months.

Supply sleds move across the frozen lake to a nearby village. Trains once ran on the ice.

By Tom Prideaux

Ellen Terry wowed the New World onstage–and off

A queen of the theater, golden-haired and gifted, a luminary of the English stage, came trembling to America—and triumphed

When Ellen Terry, making her first voyage to America, arrived in New York harbor at dawn on October 21, 1883, it seemed to the swarm of welcoming reporters that the ruling queen of the English stage half expected to be shot at sunrise. She was edgy and scared.

Before the S.S. *Britannic* docked, Ellen and her great partner, Henry Irving, were transferred to a private yacht where the interviews were to be held. It was a gala event, for Irving was bringing from London his celebrated Lyceum Theater company for its first U.S. tour. Many of the reporters expected to be high-hatted by the glamorous acting team. But Irving charmed them at once with his modesty and excellent cigars, not to mention the cold chicken, champagne and band provided by his American manager.

While the band played "Rule, Britannia," Ellen made her official entrance, a tall, golden-haired creature of 36, wrapped in tawny scarves and sashes, and looking, according to one reporter, like "a pre-Raphaelite saint." She had been warned that American reporters were devils, given to asking horrid questions, or disguising themselves as bellboys or waiters in order to spy on visitors. When they asked Ellen about the first role she was scheduled to play—Queen Henrietta in *Charles the First*—she grumbled that she disliked the part and couldn't imagine why she was playing it. When another reporter asked if he could send her friends back home a message, her blue eyes filled with tears, and she sobbed, "Tell them I never loved 'em so much as now."

After the interview Ellen and Irving took separate carriages, he to the Brevoort House on Fifth Avenue and she to the Hotel Dam (named after its owner) near Union Square. On the way Ellen's mood was not improved by noting "the muddy sidewalks and the cavernous holes in the cobble-paved streets," and, once inside her suite, she fell on the bed and wailed for two hours. Ellen had been stricken by acute homesickness; she had left a daughter and son, aged 13 and 11, in England, and now she felt bleakly isolated. Only when her maid, trying to cheer her, began to play "Annie Laurie" on the parlor piano—and play it abominably—did Ellen begin to laugh.

At that point, having exorcised her blues, Ellen commenced her long romance with America. All told, she was to spend some five years in the country, including seven tours with Irving and, in 1915, a final "reading" tour by herself.

America met Ellen at the peak of her career. Offspring of a Scotch-Irish theatrical family, she had made her stage debut at the age of nine, playing Shakespeare before Queen Victoria in London, and by 16 she had acted 50 different parts. She skipped school altogether, but from infancy she was soaked in Shakespeare. Her father taught her all the female roles, and she spoke them as naturally as she breathed. By the time she joined Irving, she was already an extremely popular actress. Bernard Shaw was to write ". . . every famous man of the last quarter of the nineteenth century—provided he were a playgoer—had been in love with Ellen Terry," and many of them, he added, "found in her friendship the utmost consolation one can hope for from a wise, witty and beautiful woman."

The reckless democrat

Ellen's style of acting was peculiarly suited to Americans. Its very simplicity reassured them that she was not putting on fancy airs or acting over their heads. Her lack of affectation, in fact, moved some critics to accuse her of not acting at all. They did her an injustice. For she was a deft technician who calculated every syllable, every pause and gesture, to give an illusion of spontaneity; she was a *trompe l'oeil* performer who made artifice seem real. Most important, her deep, slightly husky voice was an instrument for blessedly clear diction, which projected not only words but meanings. By making Americans really enjoy and understand Shakespeare, she banished their fears of being uncultured hicks.

Temperamentally, too, she was in tune with America. Optimistic, industrious and recklessly democratic, Ellen once said, "I have always thought it hard to find my inferiors," not meaning to abase herself but simply recognizing the innate worth of almost every individ-

Kerrison Preston, Esq.

Ellen's delicacy and tawny beauty were caught in this portrait by her husband, G. F. Watts.

ual. Shaw had in mind her all-embracing cordiality when he wrote to her, "I am convinced that with you a human relationship is love or nothing."

Ellen's views of America were often patchy, seen from trains, or while rushing from stations to hotels to stage doors. But on longer stopovers she devoured the sights and made friends. No sight pleased her more than the new Brooklyn Bridge, especially when it glistened with ice and snow, "a gigantic trellis of dazzling white. . . ." Her memories of Brooklyn were enhanced by the famous pastor, Henry Ward Beecher, who, at 70, had never been to a theater until, with his wife, he saw Ellen and Irving in a play. "It burst upon my ripe old age," he wrote Irving, "as June would upon a Greenlander." He then invited the couple to a Sunday service in his Plymouth Church, followed by lunch in the Beechers' Brooklyn house.

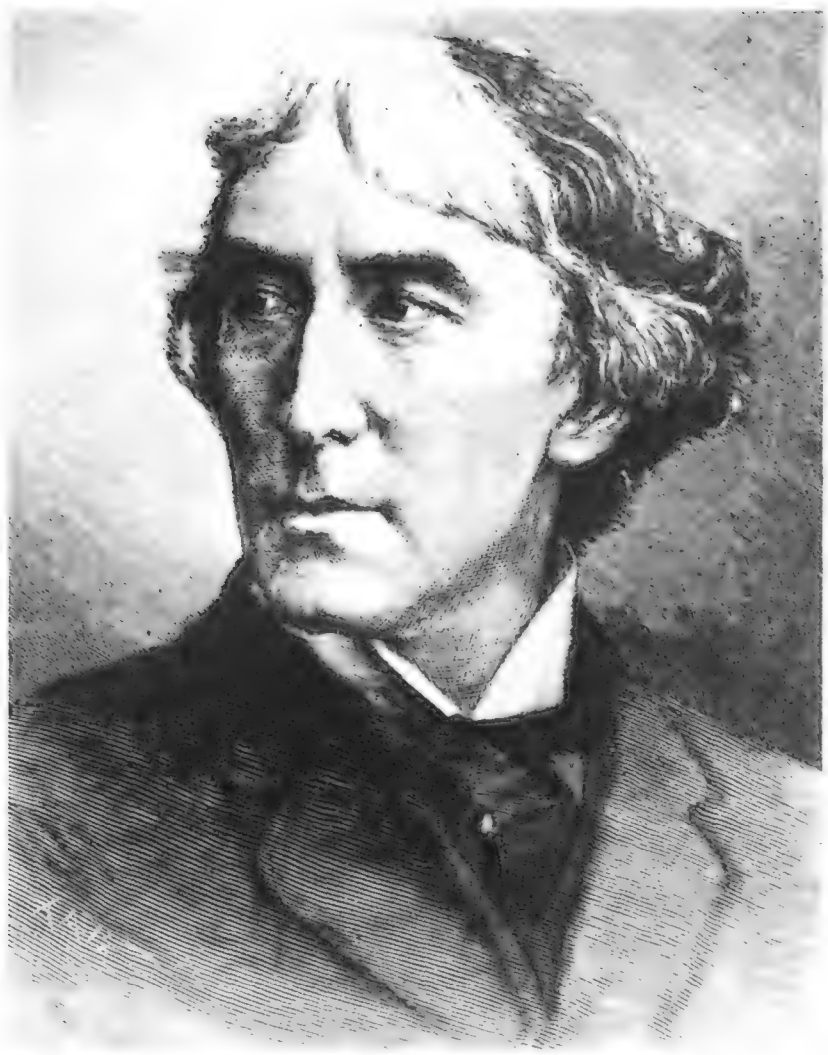
Beecher, with his proud head and flowing locks, looked distinctly actorish—like Irving. But in spirit he was closer to Ellen. At heart a rule-breaker, he liked to romp with children at Sunday school picnics, and was as casual in his dress as he was cordial to everybody he met. Accused of seducing a friend's wife, he was finally cleared after lengthy litigation, but a cloud of scandal still hung over him, which threatened the spectacle of his sanctity but not his popularity. His wife, who bore him ten children, was steadfastly loyal, and held hands with him, Ellen noticed, at the luncheon table.

At first, Eunice Beecher was polite but aloof, probably in the belief that all actresses were sinful. It was also likely that she knew of Ellen's two children born out of wedlock (there had been obstacles that kept Ellen from marrying their father, with whom she lived in retirement for five years before they separated), all of which might make the pastor's wife uneasy with her theatrical guest. Yet before the visit ended, Eunice was reminiscing freely about her own strict girlhood, when

The Tate Gallery

An entrancing subject for artists, Ellen was portrayed as Lady Macbeth by John Singer Sargent.

For years a senior writer for Life *and the author of books on art and the theater, Tom Prideaux's* Love or Nothing: The Life and Times of Ellen Terry, *is to be published this month by Scribner's.*



As Ellen was the Queen of the Western stage, Sir Henry Irving was recognized to be the King.

her father once threw scalding soup at her neck because she was wearing a new blue silk dress with a modestly open collar. As the two women said good-bye, they both honored the occasion by crying.

From New York, Irving's show train took off for Philadelphia, the first lap on the tour, hauling nearly a hundred performers and technicians, tons of scenery and costumes for eight plays, including gas tanks for special lighting effects, and a thousand new wigs.

One of Ellen's favorite stops was Boston. Over the years she played there so many times that her memories were not always in chronological order, but she vividly recalled the witty, exuberant Mrs. Jack Gardner whose art treasures were housed, as they still are, in her incredible palazzo with its lofty courtyard, some of it transported stone by stone from Venice. Ellen gave special eye to John Singer Sargent's portrait of her hostess, gowned in tight-fitting black with no ornament except a rope of pearls around her wasp waist. A year after Sargent did Mrs. Jack, he painted Ellen as Lady Macbeth in her famous costume adorned with real beetle wings. A Boston oasis for Ellen was Oliver Wendell Holmes' house on Beacon Street. "Oh, the visits I inflicted on him," Ellen recalled. Since her visits were usually in winter, they moved their chairs close to the fireplace and, as Ellen said, "At once it was four feet on a fender." Ellen could contribute to the literary chatter, for in London she mingled with Tennyson, Browning, Dante Gabriel Rossetti, Lewis Carroll, Wilde and Whistler.

In Chicago, which she had heard was barbaric, the audience greeted *Hamlet* ecstatically, and Ellen felt that her Ophelia had never been better.

After two days in Detroit, the company took a day off to sight-see near Buffalo, and Ellen began her long love-hate relationship with Niagara Falls. ". . . it became dreadful . . . I was *frightened* at it . . . wanted to follow the great flow of it." At another time she was overcome by its beauty, "with pits of color in its waters, no one color definite. All was wonderment, allurement, fascination." At her final visit it was "wonderful but not beautiful any more . . . the merely marvelous has always repelled me."

Moving to Toronto, Ellen indulged her enthusiasm for snow, and went tobogganing, accompanied by some young sportsmen. "I should say it was like flying! The start! Amazing! 'Farewell to this world,' I thought as I felt my breath go. . . . I rolled right out of the toboggan when we stopped. . . . Henry Irving would not come, much to my disappointment. He said that quick motion through the air always gave him the ear-ache."

After a week in Washington, where Ellen and Irving dined at the White House with President Chester A. Arthur, the company made a hit-and-run tour of five New England cities, while Ellen, needing a rest, stayed an extra week in the Capital.

Her first American tour, which wound up back in New York, ended in a flurry of farewell toasts and poems, and the beautiful news that the tour had grossed nearly a half-million dollars. To be sure, Ellen and Irving would return—again and again.

During the Lyceum company's second tour in 1884, Ellen wired the children's guardian to send one of them over to America. By not specifying which one, she wisely avoided any hint of favoritism. The guardian brought over Teddy, who arrived in time for Christmas dinner in Pittsburgh, and joined the company as a minor juvenile actor in Chicago.

Almost half American

In January 1888, while they were in New York, Irving and Ellen were dining at the Hoffman House, a Broadway hotel, and not rushing their meal because a terrific snowstorm had hit the city, and they assumed that their performance of *Faust* would be canceled. The wind reached 84 miles an hour. Electric light poles were blown down. Frost had cut off gas supplies. But, close to curtain time, a messenger ran into the

Onstage, the team of Terry and Irving. Was there an offstage romance? No one could ever say.

dining room, announcing that their audience had started to assemble. Hearing the news, a dozen male diners formed a rescue squad and took turns carrying Miss Terry on their shoulders for 12 blocks, or what might have been across the snow fields of Alaska, to the Star Theater. Ellen played to a very small audience, which included New York's Mayor and his daughter, but the show was a roaring success, and for once, in contrast to that epic blizzard of '88, the hellfires of *Faust* looked comfortably warm and cozy.

In the summer of 1893, the Lyceum stars, after a train ride across Canada, opened in San Francisco. No matter how often Ellen visited America, she reacted strongly to what she saw, for or against, or both. In California, she wrote, "For spite of fruits and flowers, the marvelous bay and the Golden Gate, there is printed on the face of the people, 'This-is-America-the-home-of-the-money-getter-Mammon-is-our-God,' and it spoils their faces and voices, although I *must* admit I don't think it spoils their hearts, for they are kindly to excess." In Mammon's hotbed she noted with approval that while in London the largest Lyceum receipts for a single night were £430, in San Francisco they exceeded £1,000 ($5,000).

Next on the route were one- or two-night stands in Portland, Seattle and Tacoma: "... Sleeping two nights in the Cars—(Oh, I don't like that.) I shall be glad to get to Chicago." She arrived there, via Minnesota, at the time of the nation's first great world's fair.

One of the reporters, who interviewed her on the train, wrote, "She persists in talking about her son, who has been very naughty and married a very beautiful and adorable girl." Then the reporter succumbed to Ellen herself, who was 46, extolling her "vast vintage of youth which mellows, not fades; she exults in her years, not shrinks at their approach." He noted further that she was "supple as a tiger," and her eyes were "turquoise stars," and marveled that the "breezy creature sitting on the dusty floor of the car . . . could have a marriageable family. In proof, she called a dark-eyed girl from the compartment and introduced her as 'my daughter.' "

In Chicago Ellen received the news from her son that his new wife was pregnant. "Darling Boy," she wrote back, "I've just got your letter and May's post-script . . . I'm wishing nothing but that I were home—but that cannot be. Thank God, you are not both *here*, streaming about this unquiet galloping country. One wants extraordinary physical order to cope with America."

As for the world's fair, Ellen was too excited about being a grandmother to pay it much attention. She merely wrote, "This Chicago has gone mad over itself and its Fair—and certainly it has reason to be proud." She made no mention that she herself, in Sargent's portrait of her as Lady Macbeth, was hung at the fair. In fact, the big art exhibit might have seemed like old home week to Ellen, including as it did a dozen paintings by her London friends: Sir Lawrence Alma-

At height of American visit she displayed a chiseled beauty sparked by blue eyes, a face that might have launched a thousand ships on the oceans of applause it created.

Tadema, Ford Madox Brown, John Millais and her ex-husband, George Frederick Watts, at the time one of England's most successful painters, whom she married when he was 46. (She was 16; they separated within a year.)

On the next tour she and Irving played Washington again and dined at the White House, this time with Grover Cleveland, and then headed farther south. From New Orleans she wrote to her son, who had adopted the name Gordon Craig, "The *Sunny* South, indeed? They should call it the dusty South, I think. We have had a most uncomfortable but interesting week traveling in the Southern States. Poor places! Defeated (as *places*), all gone to bits and dust. No money to mend, to tinker, to repair, and keep in order stately homes and beautiful gardens. The people are very nice, but their houses are naught. In the North the houses are nice and (*some* of) the people are naught. . . . This hotel we are staying in has huge rooms, and I feel as if I were staying in modern Venice one moment, and then I'm reminded of Old Paris, again the dusty rooms and streets suggest Bloomsbury . . ." (a London enclave for intellectuals).

At this time, Ellen befriended two young actors in the company, Mr. and Mrs. Ben Webster III. Ben came from an old theatrical clan and his wife was to become the stage and screen star, Dame May Whitty. May was not always happy on her first American trip. She griped about the muddy, smelly streets, about a rat that crouched on the edge of her bathtub, and about Ellen Terry's little sideline project. At odd hours, Ellen was directing a one-act play about a medieval leper colony, written by Irving's son, Laurence, and performed eventually at a special matinee in Chicago. "We're rehearsing that filthy leper play," May wrote from New Orleans to a friend; it "takes up all our time, it's such a muddle owing to the erratic Nell's stage management." May liked to tease Ellen and poke fun at her, but she admired her extravagantly. Thanks to May, we see how Ellen met a disaster that almost ended the leper play, and her career, altogether.

After leaving New Orleans for Memphis, the show train ran into a heavy storm, with floods and washouts along the line. The train had to crawl on a wooden trestle over a marshy area, where the rising waters began to cover the tracks. In one car Ellen and Irving gazed out at a parade of floating wreckage: fence posts, chicken coops, pots and pans, and, here and there, on a stray plank, coiled snakes.

The passengers knew that at any moment the wooden trestle might buckle, and the engine explode and sink with a sizzle, dragging all the cars to oblivion. According to May Webster's report, Edy rushed in from another car to comfort her mother, only to find her with her gloves neatly buttoned and tying on her veil. With perfect calmness, Ellen addressed her daughter: "Edy, darling! Hurry and dress yourself, we shall

Bernard Shaw wrote the play for her. Ellen promoted Carew to a starring role, and married him.

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probably have to swim." The company finally reached Memphis, late, hungry, but dry.

By now Ellen was saying, "I often feel that I am half American." In her mind, her tours were associated not only with her stage career, but with her family problems and emotional crises, many of which were played out against an American panorama. In Memphis she received a letter from her son, Teddy, hinting that he and his wife were about to separate, a prospect that dismayed Ellen because her own marriages had been so unsuccessful. A few weeks later she was further shocked by discovering that Edy, who seemed an aloof and starchy young lady, had fallen painfully in love with a married actor in the troupe. In Chicago, the "filthy leper play" came off far better than anyone expected. But two days later she learned that her beloved younger sister, "Floss," had died in childbirth in London. In Philadelphia an increasing chill in her long and loving relationship with Irving—though nobody knew how physically "loving" it had been—moved her to write her son, "I scarcely see much of Henry except in the confounded theater." And from Pittsburgh she wrote him, "I am as blue as indigo."

But on her next American tour in October 1899, her outlook changed. "New York is more marvelous than ever," she wrote to Teddy from the Plaza Hotel at Central Park and Fifth Avenue. (On this same site the present Plaza Hotel was built in 1910.) "We were knee deep in flowers, letters, gifts of all sorts before we had been here six hours."

Since Teddy had suddenly begun to show his striking talent in the visual arts, Ellen appointed herself his sales agent and took samples of his bookplates and illustrations to Scribner's, Harper's and other American publishers, and urged such stores as Brentano's and Wanamaker's to carry them. Temporarily, at least, Ellen and Irving felt closer to each other again, for America was their joint territory, crowded with memories. From Toledo, Ohio, Ellen wrote to George Bernard Shaw about the new play he had written for her, *Captain Brassbound's Conversion*. Ellen had been having reservations about its merits (she was right). A year later, she took her seventh and last U.S. tour with Irving, and felt the old thrill: ". . . lovely day . . . New York wondrously improved. . . ."

A blend of circumstances ended the partnership of Ellen and Irving. They parted amicably, she found work with other managements, and Irving, after several battles with illness, died in 1905. Ellen began to think more kindly of Shaw's play, and agreed to act in it. In the cast was a stalwart young man named James Carew, newly arrived in London, who played a secondary role of a naval officer. Ellen found him immensely attractive, and he was dazzled by her charm and eminence. In 1907 they took *Captain Brassbound's Conversion* on an American tour, with Jim Carew promoted to the title role. They were secretly married in Pittsburgh. Since Ellen was in her late 50s and he in his 30s, it was, perhaps, a foolish business. Yet they enjoyed two years or so of happiness, and remained good friends after they separated. Carew can rightly be called part of her American experience. He was born in Indiana.

Ellen ended her career as she started it: barnstorming—over land and sea—from the Palace Pier Theater at Brighton to Australia. Revisiting America, she trouped her one-woman Shakespeare show from New York to Seattle, where she had acted with Irving—only this time she ventured still farther to Vancouver, where her reputation for informality had obviously preceded her. "Ellen Terry is not coming to Vancouver to act," boasted a local paper, "she is coming to talk, chat, gossip (thank heaven not to 'lecture')."

Ellen died in 1928 in her ancient thatched cottage in Kent. Her memory was failing, but fragments of America turned up in her mind like colors in a kaleidoscope: the red brick sidewalks of Philadelphia and, as she once put it, "the low houses with their white marble cuffs and collars;" Chicago, when it was "snowing madly . . . marvelous;" West Point, where she and Irving performed *The Merchant of Venice* in a lecture hall and all the cheering cadets tossed their caps in the air; and New York, arriving there in a blue and gold October, and writing home to Teddy, "They are the wonderfullest people—the Americans."

If walls could speak, this one surely would. Ellen, in full regalia, as painted by noted tragedian J. Forbes-Robertson, in Shakespearean scene, which today adorns a wall of The Players in New York.

Fording streams was treacherous in Colonial days. One Colonel Cuthbert Potter reported that "... by Gods mercy I escaped drowning having ... wet all my linnen and papers."

By Mary Musser

To Grandmother's house? No way!

When our Colonial forebears traveled, they faced floods, forest foes, filth and food so foul as to promote famine

One October day in 1704 Sarah Kemble Knight of Boston climbed up on her sidesaddle and headed her horse for New Haven, Connecticut, 150 miles away by the Lower Road, to settle the estate of a relative. Since she was an independent widow of 38, there was no one to stop her from setting out on such a hazardous trip.

She did not ride alone, of course. She rode with the post rider who carried mail. A post was required to double as guide for persons traveling through the sparsely populated countryside. This post, though, frequently galloped ahead, leaving her far behind. Alone in the woods after dark, Sarah's apprehensions vanished only when she heard his horn signaling the Haven Inn. Haven's was a good house, clean and comfortable. She couldn't sleep, however, because men in the next room drank, argued and banged on tables.

At 4 A.M. she and the post were on their way again for a ride of 22 miles before they stopped to "bait" the horses. Coming to a river, swollen by rains, Sarah refused to ride through it. The post went on, but she stayed back to wait for the water level to drop.

Next day she crossed safely and luckily met up with some other people going in her direction. At the Thames River, they boarded a flatboat ferry. Gusty winds tossed the boat and, to Sarah's dismay, the horses "capper'd at a very surprising Rate, and set us all in a fright. . . . The Rodes all along this way," she added, "are very bad, Incumbered with Rocks and mountainos passages, which were very disaggreable to my tired carcass; . . . in going over a Bridge under which the River Run very swift, my hors stumbled, and very narrowly 'scaped falling over into the water."

Fortunately she came through unscathed and on the fifth day arrived at New Haven. After some weeks with a kinsman there, Sarah set off with him and another man for New York. She appreciated the savory fried venison of the first night's dinner, in contrast to a certain previous meal of pork and cabbage that had served her "for a Cudd the whole day after." The next night she positively couldn't eat the food and had to bed down on a corn husk mattress. Then the housemaid came into her room to make up another bed for her men companions, which, they grumbled, was much too short for them. At 3 A.M. they all arose, rode four hours until breakfast, and reached New York shortly before sunset.

On the way back to New Haven, they struck bitter cold and a raging snowstorm. Floating ice had closed the Stratford ferry. After a four-hour wait, the boat finally ventured out to make a night crossing.

March thaws were coming on when Madam Knight, sustained by some good "Rost Fowle" and "Rost Beef with pumpkin sause," rode her horse through the last "sloughy ways" into Boston. Gratefully, she penned:

Now I've returned to Sarah Knight's
Thro' many toils and many frights
Over great rocks and many stones
God has presarv'd from fracter'd bones.

Once settlers had cleared the woodland paths, they could transport goods by packhorse trains and use horses for going long distances. Sometimes two people with one horse rode in relay. One set out on horseback, the other on foot. After a time, the rider dismounted, tied the animal to a tree and walked on. When the man on foot came to the tethered horse (by then well rested), he mounted it and overtook his companion. A woman riding double with a man sat behind him on a pillion, a padded cushion with a suspended platform support for the feet.

When carts came into use, they required roads much wider than Indian paths. Even when boulders and tree stumps were left in place, building these roads was a slow, laborious process, made more difficult by the packhorse people. They lobbied against roads as a waste of public funds.

No traveler in Colonial America could go far along any road before coming to a stream. A small one he could ford, though at times this was treacherous. Colonel Cuthbert Potter reported, "there having been very much rain . . . my horse fell with me, and by Gods

Formerly an English teacher, Mary Musser is now a free-lance writer on history and travel. W. B. Park illustrated the article on "Beecher and the Creature" in SMITHSONIAN, *April 1974.*

Illustrations by W. B. Park

mercy I escaped drowning having been twice under water wet all my linnen and papers."

One crossed a river by ferry—a flatboat or simply a canoe that carried the rider while his horse swam behind. Bridges were few and floods often washed them away. None spanned the larger streams.

When Jasper Danckaerts arrived in New York from the Netherlands in 1679, he took a fall trip south into Maryland. Enduring attacks from American "muskeetoes," he and his companion went by boat, on horseback and on foot, wading through knee-deep mud and icy water with the help of a stout stick. Signposts were few. Where they couldn't hire a guide, they repeatedly became lost. In taverns, they sometimes slept on the floor on a deerskin or a bit of hay. Other nights they lodged in homes, once where children lay sick with smallpox. New Year's Day saw them back at New York's ferry, just as the boats were laid up for winter.

To see the "backcountry" farther from the seaboard, travelers needed both patience and daring. Here they faced wolves, rattlesnakes, possibly hostile Indians, besides uncertainties of food and shelter. In winter, sleighs flew across the snow, swiftly if not always safely. As Massachusetts' Governor Joseph Dudley was making a winter trip into Boston, "the way being difficult by Banks of Snow, his Slay was turn'd upon one side against the Fence next Cambridge, and all in it thrown out, Governour's Wigg thrown off. . . ."

But even as Sarah Knight took her trip, times were changing. As the population more than quadrupled, roads multiplied and so did the vehicles that used them. For the long-distance traveler, the big news was the appearance of stage wagons, so-called because they stopped at "stages" to rest or change horses, to discharge or take on passengers.

Delights of springless stage wagon

The stage wagon, its body resting on wood or leather braces, had a top and three or four backless benches, each bench seating three persons squeezed together. One person sat up front with the driver, that colorful figure with whip in hand, wearing a coarse blue jacket, homespun trousers and a beaver hat.

To board, you hoisted yourself up between the horses and the front wheel, climbed over the benches and shoved your luggage under the seat. On three sides the wagon had heavy curtains. When they were up, you could enjoy the beauties of nature and breathe freely of the country air, although it might be thick with dust. When the weather turned bad and the curtains came down, you were plunged into darkness. As those who used them testified, the wagons often "came near shaking the liver and lungs out of you" and the jolting could be "almost insupportable."

(Continued)

Backcountry travelers needed daring to face wolves, rattlesnakes, and possibly hostile Indians.

"His slay was turn'd upon one side . . . and all in it thrown out, Gouvernour's Wigg thrown off. . . ."

"My favorite airplane!"

"My favorite airplane!"

Many airlines fly the DC-9 and their crew members say there's no other jetliner like it. Many other airlines fly the DC-10 and those flight crews know it's the greatest. Maybe you have your favorite, too: The DC-9 because it holds the highest on-time departure rate (over 99%) of any twinjet in the world—which means you can depend on it to leave on schedule. Or the DC-10 wide-cabin because of its quiet comfort, roomy elegance, and similarly remarkable on-time departure rate (over 97%).

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MCDONNELL DOUGLAS

DC jetliners:
Choice of 64 world airlines.

In parts of New England no one could travel on the Sabbath. Boston closed its town gate and set a guard at the ferry to keep anyone from "going forth." Washington recorded an experience in Connecticut: "It being contrary to law and disagreeable to the People of this State to travel on the Sabbath day . . . I stayed at Perkins' tavern all day—and a meeting-house being within a few rods of the door, I attended morning and evening service, and heard very lame discourses. . . ."

Many New England taverns or inns (those in which guests ate with the host family were at first called "ordinaries") stood near the unheated meetinghouses for the convenience and comfort of the worshipers. Large towns in the South had taverns second to none, but in outlying districts one could go 20 miles before finding a dwelling, let alone a public house.

Europeans who regarded innkeeping as a low-status calling were sometimes annoyed at the independent attitude of their American hosts. True, some landlords, attuned to local patronage, treated transients as a nuisance that brought more trouble than money. More important, however, Colonial innkeepers (men or women) were likely to be persons of consequence in the community, not disposed to being ordered about. Foreign guests unanimously approved the "no tips for service" policy.

Entering a tavern, a new arrival could catch up on news and he, in turn, was pumped dry of any information he possessed. This curiosity could touch his personal affairs: Who was he? What did he do? Where was he going? Why was he going there? Some guests bitterly resented this invasion of privacy and tried, usually without success, to avoid the inquisition.

Barriers came down in the tavern. "I dined . . . with a very mixed company of different nations and religions . . . 25 planted round an oblong table in a great hall well stoked with flys."

The "entertainment" at inns ran the gamut from

When the inn was crowded, latecomers could stretch out on the floor. Nights were far from restful.

superb to awful. Washington, on an early surveying trip north of his Virginia home, had for his bed the first night "only a little straw matted together without sheats—one thread Bear blanket with double its Weight of Vermin." The next night he enjoyed "a Good Dinner. Wine and Rum Punch in Plenty and a good Feather Bed with clean Sheets."

In a good public house, guests found such food as venison, fowl, ham and bacon, mutton, seafood (near the coast), eggs and hoecake or johnnycake. Breakfast was like dinner, no less hearty. Drinks included tea, coffee, wine, cider, rum (sometimes called kill-devil), corn whiskey, brandy and flip (mostly beer, heated by plunging in a red-hot iron "loggerhead").

Many houses had only one (if any) private bedroom; most guests slept dormitory style, often with a bedmate. When the inn was crowded, latecomers could stretch out on the floor. With all the coming and going, not to mention the late-night drinking, a night at the inn could be anything but restful for the tired guest who would be awakened at 2:30 A.M. for another long day in the jolting stage wagon.

Such minor inconveniences, however, did not stop the sturdy traveler, whose tolerance level could be remarkably high. "It was not a long journey, only a month," wrote a young Moravian woman about her trip from Pennsylvania to North Carolina. And an Englishman who had once jumped out of a careening stage wagon said, "I thought it not extraordinary . . . that the roads of America should be bad; that the stages should be called wagons, and *be* nearly such." These things, he added confidently, would disappear.

And so they did. Before the 1700s ended, turnpikes began to unroll between cities. The stage wagon metamorphosed into a graceful coach riding comfortably on springs. Then railroads pushed it aside and finally gave way themselves to superhighways, clogged despite their eight lanes.

"I dined . . . with a very mixed company . . . round an oblong table in a great hall well stoked with flys."

The amazing story

It was made in England in the eighteenth century and it cracked the very first time it was rung on these shores. Yet for soldier and citizen it has remained an enduring symbol of Liberty and Freedom in the new republic. Read on about the Liberty Bell and about a rather shrewd investment some twentieth century Americans have been making in it.

In 1751, the Province of Pennsylvania had a policy of individual freedom that much influenced the other colonies. It was fitting that when the Assembly of the Province decided to order a bell, they asked that on the bell's shoulder be inscribed the biblical phrase from Leviticus XXV. 10 "Proclaim liberty throughout all the land unto all the inhabitants thereof." Thomas Lester's Whitechapel Foundry in London was chosen to cast the bell and in September 1752, it arrived in America. Philadelphians gathered in the State House yard to hear it ring out. It cracked, however, upon the first strike, perhaps due to mishandling by amateur colonial bell hangers, eager to hear it. In 400 years, it was to be the only bell from Whitechapel's to have so cracked. "Two ingenious workmen", John Pass and John Stow recast it, but Norris did not like its tone and had it recast a second time. It was then hung in the State House tower; and for the next twenty years, it would ring out on the burning issues of the day. It loudly proclaimed the coronation of George III but was muffled as it sadly tolled the "death of liberty" when the Stamp Act was enforced in 1765.

THE BIRTH OF A NATION

On June 1, 1774, the bell was again muffled and toiled in sympathy with the people of Boston on the closing of their port. Following receipt of tidings of the Battle of Lexington, April 25, 1775, the bell called together 8,000 people (by computation) who assembled in the State House yard and agreed, unanimously, "to associate for the purpose of defending with arms, our lives, liberty and property against all attempts to deprive us of them."

The supreme effort of the bell to proclaim liberty was next in order. The historic second session of the Continental Congress was already underway, and the final break with Great Britain only a matter of weeks, perhaps days. The resolution sponsored by Richard Henry Lee was presented June 7, 1776, declaring "that these United Colonies are, and of right ought to be, free and independent states; that they are absolved from all allegiance to the British Crown and that all political connection between them and the State of Great Britain, is and ought to be totally dissolved;" In the interval, a special committee had been appointed to draft a formal statement. The Lee resolution was agreed to July 2, and the Declaration penned by Thomas Jefferson, after revision in the committee of the whole, adopted July 4. Then, on July 8, 1776, the bell rang to summon the patriots for the first public reading of the Declaration of Independence, which had been adopted four days earlier by the Continental Congress. The bell was now part of American history. The birth of an Independent Republic, the seed of a world power, was an accomplished fact. The old State House Bell, as it was then called, was now to "Proclaim liberty throughout all the land unto all the inhabitants thereof," to ring out independence, to have its sequel taken up in every town and hamlet, to set in motion a never-ceasing force against tyranny and oppression. When a British army threatened to occupy Philadelphia in 1777, the Bell was dramatically spirited away to nearby Allentown and hidden beneath the floor boards of the Zion Reform Church. After it was returned to Philadelphia in 1778 it pealed forth great news, ringing out loud and clear from Cornwallis's surrender in 1781 until it cracked again, permanently, in 1835. It has been cautiously rung many times since with a rubber mallet. In 1944, on D-Day, its muffled sound was broadcast over network radio.

IN COMMEMORATION

In friendly recognition of America's 200 years of Independence, the British government recently announced that the people of Great Britain are sending a birthday gift to the people of the United States. It will be a bell — a 10,000 pound super Bicentennial Bell — five times the weight of the Liberty Bell! A new tower to house the huge bell has already been erected at the new Visitors Center at Independence Hall National Park in Philadelphia. The gift bell will be cast in the spring of 1976 at the Whitechapel Foundry on the very site where the first Liberty Bell was cast. It will be delivered and installed in the Philadelphia tower to be rung for the first time on July 4, 1976.

To further commemorate the 200th anniversary of the Declaration of Independence in 1976, the same famous Whitechapel Bell Foundry of London (makers of the original Liberty Bell in 1752) has been casting a limited number of regular size Bicentennial Liberty Bells to the original design and on the original site. About 100 of the two thousand pound full-scale replicas are being cast, for delivery to communities throughout the Nation. These are being sold to non-profit organizations in communities across the nation under a strict allocation of only two bells per state for each of America's fifty states. Many have already been delivered. Bell number One has been consigned to the Smithsonian for their "Symbols of America" exhibit. The National Flag Foundation just unveiled their bell in Pittsburgh at the Carnegie Art Museum on July 4th this past summer. The Copernicus Society in Philadelphia recently received their bell, and another just went to a County Bicentennial Commission in California to be on exhibit at the Los Angeles County Fair. A chapter of the Young Men's League in Texas will be exhibiting their replica at the South Texas State Fair. A number of local Chamber of Commerce groups have ordered replicas. Two have gone to groups in Tennessee and another in Illinois. A west coast Liberty Bell Foundation and the Honor America organization in Florida are awaiting delivery of their replicas. There are only about thirty of these full-scale bells remaining that are not yet reserved.

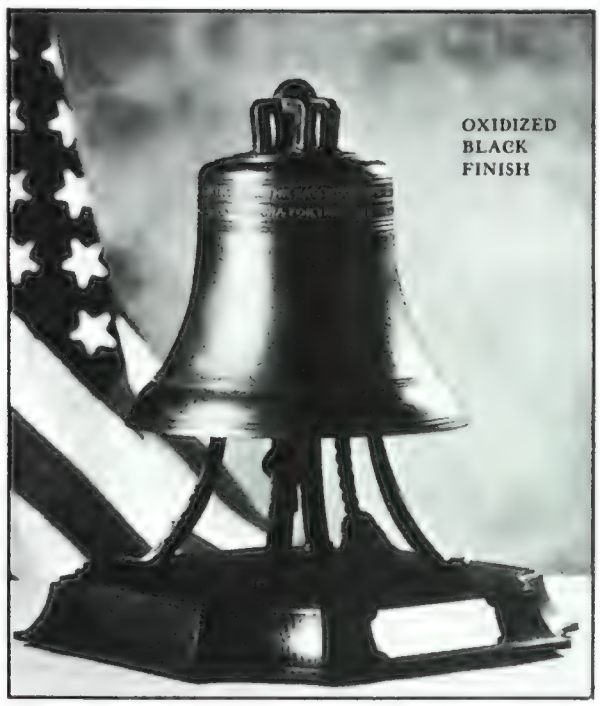
In addition to the 100 large bells Whitechapel is casting a Limited Edition of 2400 smaller 1/5 scale replicas utilizing a special process. Over 1700 of these bells have already been ordered and about 1400 of them have been delivered, thus far, to Americans throughout the U.S.A., with the backlog of 300 to be cast on schedule.

OFFICIAL SANCTION

This worthwhile project has been given the recognition, sanction and endorsement, of many organizations and official Government agencies. For instance, The Bicentennial Council of the Thirteen Original States, the non-profit organization comprised of state officials representing the Bicentennial Commissions of each of the thirteen original states, has designated each of the Whitechapel replicas as an "Official Bicentennial Commemorative Liberty Bell." The administrators of Independence National Historic Park, where the original Liberty Bell is enshrined, (operated by the National Park Service, U.S. Department of Interior) have also pledged their full cooperation in support of this Official Bicentennial Liberty Bell Project.

Many veterans groups, patriotic organizations, service clubs, local chambers of commerce, etc., have already invested in the ownership of one of the limited number of the smaller replicas. They plan to use them during the Bicentennial period and then retain them for their collector value thereafter. In fact, the value of early casting of the bells has already increased due to the rapid rate of inflation that has occurred in England during the past two years. When Whitechapel commenced casting the small replicas, the basic bell in the black finish sold for $756, as compared to its price today of $925. And the foundry just recently gave notice that due to further inflation, they will be forced to raise the price again, early in 1976. The purchase price of the replica in the oxidized black finish (the same color as the 1752 bell) is $925. In polished bronze it is $985 . . . in .999 Silver plate it is $1050 and in 22 karat gold plate it is $1460. These prices include duty, special crating, insurance and overseas shipment to the U.S.A.

Each 1/5 scale Liberty Bell replica weighs approximately 20 lbs. and stands 15½ inches high on a plynth of hand-carved Oak grown in Windsor Forest. A plate made from Old English sterling silver is mounted on the right hand side of the plynth, bearing the words "Cast by the Whitechapel Bell Foundry, London, to the Original Design of the Liberty Bell Cast by Them on the Same Site in the Year of Our Lord 1752". For the left hand side, a special hand-engraved matching silver plaque bearing the owners name and personal inscription can be ordered for $5.00 and 35¢ a letter for engraving.



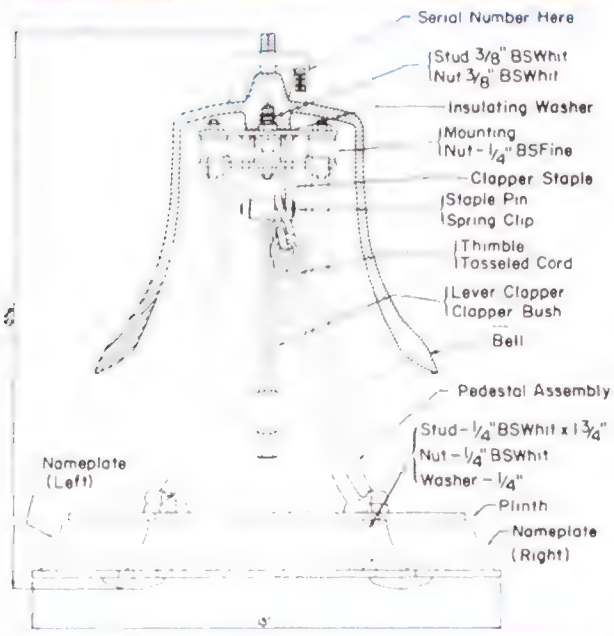
The Bicentennial bells are exact in every particular to that cast in 1752 by Whitechapel's master founder, Thomas Lester, for the State House of Pennsylvania (now called Independence Hall). The Whitechapel Bell Foundry was founded in 1570 during the reign of Queen Elizabeth I. Many of its earliest bells are still in existence, including two bells at Westminster Abbey cast in 1583 and 1598. Among the recent bells from Whitechapel are those of Washington Cathedral, hung in 1964. The bells of Big Ben, which towers over the Houses of Parliament, were also cast at Whitechapel, as were the great bell of Bow in London in 1750 and the bells of St. Clement's in 1588, the year of the Spanish Armada. Both are remembered in the old nursery rhyme, "Oranges and Lemons." The bell itself is made in the manner of the original Liberty Bell, embossed with the quotation from Leviticus XXV. 10 in type face used by the original bellfounder, Thomas Lester. The clapper, drawn into a hand grip with a tasseled cord, strikes the walls of the bell and causes it to ring a perfectly-tuned note at each stroke. Each bell has been meticulously tuned (actually five partial tones are tuned together) to its final and perfect pitch — E Flat — the same tone as the 1752 bell. The bell will have no crack! It will sing its song as magnificently as the original Liberty Bell did when Lester tested it before it left London. In

of the Liberty Bell

this way, the ancient and historic contract beween London and Philadelphia is fulfilled.

HOW TO MAKE A BELL

To make his reproduction possible, the Whitechapel Bell Foundry has incorporated and refined an ancient process which had not been used in bellmaking for over 600 years but has been used mainly to reproduce exact detail in fine metallic art work. This is the cire perdu or "lost wax" method of bellcasting, which was recorded most notably in the 12th century by the medieval monk Theophilus in his "De Diversis Artibus", but which was subsequently superseded by the "false bell" method. The principal advantage of the "lost wax" process — and an absolute essential in the making of the Bicentennial Liberty Bell — is the high quality of the resultant castings, particularly where intricate or decorative work is involved. The Liberty Bell has an inscription of 170 separate letters, and this inscription proved disappointing when cast normally at a scaled-down ratio of five to one. To overcome this, and to preserve the clarity of the lettering at reduced size, the Whitechapel Bell Foundry evolved, after two years' research, a process which involved fashioning the primary pattern of the bell not in traditional clay but in wax of medieval bellmakers.



In essence, the technique at the primary stages is not dissimilar to that described by Theophilus, although now considerably refined. In short, it involves making a complete bell in wax, and then investing, or coating, this in a ceramic material.

PERFECTION OR DOOM

This ceramic material builds up very slowly in outer shell of some ten coats thickness, using a combination of first aqueous colloidal silica and then calcined china clay. This process, carried out by hand with immense care, is critical to the whole and takes about a week. Any error in the application can result in an imperfection, in which all of their exacting work is for naught, for each finished bell must be *perfect* or it is destroyed and consigned to the kiln.

The invested bell is then placed in a de-waxing furnace, which melts the original pattern, leaving only the ceramic shell — now the master pattern. This is baked at high temperature and provides the final mould from which the actual bell is then cast with molten bell metal. When the metal has cooled and hardened, the ceramic pattern is smashed away, leaving a magnificent bronze bell.

The casting, and all subsequent stages — such as tuning, polishing, and assembly — are done by conventional methods, the result being a bell of the highest authenticity. The process allows the foundry to capture the original lettering of 1752 — the precise form of the letters used by Thomas Lester was checked by reference to dozens of bells cast by him and still in use in steeples all over England.

MOUNTING

The mounting of the Bicentennial Liberty Bell has been carefully engineered and no detail has been spared to obtain absolute perfection. The bell is secured by a single center bolt inside its crown to a steel plate to which the jaws of the clapper staple are welded. The forged clapper swings between these jaws on a plated steel pin running in a nylon sleeve to ensure free silent action and perfect mechanical insulation. It is actuated by a silken tassel attached by a solid brass eyelet to a lever which is part of the clapper forging.

To provide the "give" necessary to insulate the bell and clapper together from the forged pedestal and oak base, and to enable it to absorb the occasional jolt in safety, the steel crown plate is connected to the pedestal through four special neoprene and rubber vibration mountings, which in turn are mounted on a steel ring which forms a common connection for the four "legs" of the pedestal. The lower ends, or feet, of these forgings are bolted through the oak plinth. In reducing a bell by scaling it down to one-fifth of its original size, the clapper must be reduced by the same scale to maintain the correct proportion; but while profiles can be scaled, "nature" cannot and the miniature clapper would not bring out the rich tone of the bell. This problem was overcome by introducing into the striking face of the clapper forging a "plug" made from a special type of nylon, which backed up by the weight of the clapper bell, ensures that the bell gives its full tonal resonance.

MADE TO ENDURE

Theophilus, writing on the intricacies of bell founding, stated "that the craft requires *not* indolent workmen, but keen dedicated men, for fear the bell be spoiled at some point in its manufacture." Whitechapel has ensured that nothing has been spared in the design and making of the Bicentennial Bells and their mountings and has fully maintained the ancient traditions of its craft. These bells have been made to *endure*. With proper care, there is no reason why they should not ring in the tercentary and quadricentary celebrations of these United States. Every bell is fully guaranteed — against any defect. And they are guaranteed *never* to crack!

Only 2,400 bells will be cast — each bell thus symbolically representing a separate month of independence. WHEN THE LIMITED EDITION IS COMPLETED, THE MASTER MOULD WILL BE DESTROYED. Only a limited number of Americans will ever have the privilege of owning one.

Less than 700 are still available for casting before the Bicentennial officially begins on July 4, 1976. At the end of September, approximately only 170 Oxidized Black, 265 Polished Bronze, 145 Silver plated and 110 Gold plated bells of the total 2400 remain to be cast.

A PRUDENT INVESTMENT

Although the bells have been available but a relatively short time, more than 1700 have already been snapped up by collectors, businesses, universities, and private individuals. Indeed a bell, purchased from one of the earlier castings, would already bring almost 30 percent more in resale at the established price.

While there are no direct comparisons, it is interesting to chart the continuous growth in value of certain other limited editions exported from Great Britain during recent years. The Winston Churchill Commemorative Medal struck in London in 1965 increased in value by 80 percent within two years. Perhaps the record is held by a pair of Dorothy Doughty quail, issued by the Worcester Royal Porcelain Company in 1940 as part of a limited edition, which fetched about $50,000 in a spirited auction recently. To take a more ordinary example, a porcelain figure of Princess Elizabeth, part of a 1947 limited edition, sold for $280 each, is now valued at over $4,000.

GOOD TO GET – GOOD TO GIVE

Of the nearly fourteen hundred bells thus delivered, each has been received with absolute satisfaction. Historical Societies, Foundations, Businesses, Churches, Museums, even Government Agencies, have been, without exception, well pleased. So, too, have the most finicky of private collectors. A number of generous subscribers have ordered the bells for the purpose of donating them to Universities, Colleges, and Museums. Some subscribers order one for themselves (and their families) and another to donate. Such a gift will be long-remembered.

If you wish to commission the casting of a bell, we urge you to fill out the coupon below and send it at once, along with your deposit, to avoid disappointment. Since less than 700 replicas remain and the total readership of *Smithsonian* magazine is estimated to approach a million people, we must insist on the following terms: serial numbers will be assigned strictly on the basis of time of receipt, and we cannot guarantee early delivery of any order received after December 15, 1975.

Each bell is fully and unconditionally guaranteed. They are not available in stores, nor will orders from stores be accepted.

LIMITED EDITIONS COLLECTORS SOCIETY

Subsidiary of The Sturges Corp., 160 Old Derby Road, Liberty Plain
Hingham, Massachusetts 02043 SHI

To: Mr. Douglas Hughes, Master Founder, Whitechapel Bell Foundry
I wish to commission the casting of a Liberty Bell Replica in the finish checked below. Please make a casting reservation and assign a serial number to me. I understand that upon completion of my bell I will receive an owner's certificate and will be listed in your Master Founder's directory as the original owner. The bells in this limited edition are serially numbered in the order in which payment or deposits are received.

Signature _____

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(Please Print)

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Select One Finish

High Gloss Gold	$1460 ☐
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Please make a check payable to The Liberty Bell Limited Edition, and mail to Limited Editions Collectors Society, 160 Old Derby Road, Hingham, Mass. 02043

☐ Payment in full is enclosed ☐ Charge my *deposit* to: BankAmericard No. _____

☐ $100 deposit enclosed Master Charge No. _____

Expiration Date _____

By Lee Tepley

Fireworks erupt when hot lava pours into the sea

Swimming up to an underwater flow, divers solved the mystery of how lava stays hot long enough to move across the ocean floor

When molten lava, 2,200 degrees hot, flows over land, it cools into black rock. But when it meets seawater, it sometimes shatters into millions of black sand particles. What has puzzled geologists for years is that so much lava survives the shock of sudden cooling and somehow flows underwater to form pillow-shaped masses long known as pillow lavas.

Some geologists had suggested that underwater volcanoes sometimes ejected jets of highly fluid lava that cooled as they fell back to the sea floor. Others suggested that lava forms globules when mixed with water much as oil does. Still others visualized newly formed pillows in a jellylike state rolling along the seabed to their final resting place.

Even with the advent of research submarines and underwater television, it is highly unlikely that anyone will be lucky enough to be near an undersea volcano when it erupts—and lucky might not be the right word. But sometimes lava from above-ground volcanoes flows over the land and into the sea. Might scuba divers be able to watch pillow lavas form?

An opportunity arose several years ago when Mauna Ulu, a vent of Kilauea Volcano in Hawaii, erupted and sent lava flowing into the sea. James Moore of the U.S. Geological Survey invited me to try to photograph their formation underwater. I visualized myself swimming up to hot lava underwater and asked, "Is it safe?" He answered, "I don't know. No one has ever gone into the water near an active lava flow before." I tried again: "How does hot lava act underwater?" His reply: "That's what I would like to find out."

Thus a couple of days later I found myself swimming toward an active lava flow with Richard Grigg, a University of Hawaii marine biologist who was studying how fast coral reestablished itself on old lava flows. We moved along a steep slope of almost pure black sand in quiet waters 50 feet below the surface of a very disturbed sea. The sand, formed by molten lava cooling suddenly and shattering as it struck the water,

Clouds of steam billow up where a lava flow from Hawaii's Kilauea Volcano spills into the sea.

Approaching from seaward, a diver moves cautiously through warm

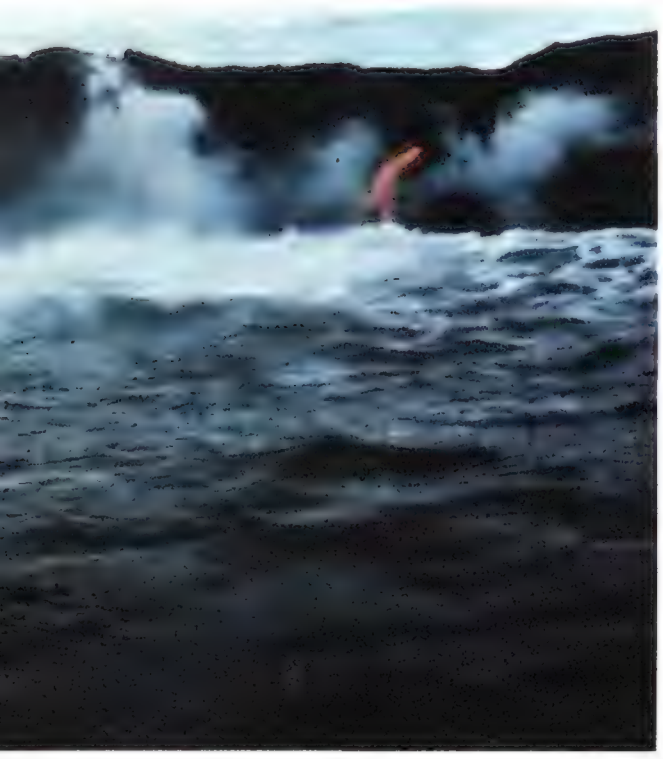
swirled around us in smoglike clouds. Ahead of us a series of lava streams and falls flowed into the ocean. Pushing my bulky underwater movie camera ahead of me, I swam hard to keep up with Rick. Abruptly the slope changed from black sand to large blocks—recently cooled lava that now and then broke loose and tumbled farther down the slope.

We glided down the block-covered slope toward a sandy bottom 100 feet below the surface. In a blue-green world, a coral reef enveloped by hundreds of fish came into focus. A single crevice in the coral revealed five lobster and two moray eels. Nearby coral reefs—now buried by sliding lava blocks and black sand—had once been their home. Converging on this one uncovered reef, they had found a new shelter. Through a gentle rain of black sand, I filmed this last remaining home of marine life in the area.

Swimming along the base of the lava slope a short distance from the coral reef, we came upon a tube of lava (now hardened) two to three feet across that had worked its way down to a depth of 100 feet and then flowed about 30 feet across the flat sandy bottom. On dry land a tube like this is not uncommon, but I could not understand how it had got that far without cooling and solidifying.

The sun was still high as Rick and I climbed the ladder and reboarded our support ship—the Coast Guard cutter *Cape Small*. Moore, who had been resting from an earlier dive, told us that he had abandoned his original idea of trying to observe at close range the underwater formation of pillow lava. It seemed too dangerous to venture into the shallow water close to the cliff where lava was entering the sea. We agreed that in succeeding dives we would explore only the deeper and calmer waters far from the cliff.

Early in the afternoon, the three of us reentered the water and descended to a depth of about 60 feet. A light rain of black sand fell gently through the calm clear water. I was blissfully unaware that we were slowly moving upward as we swam along the now familiar slopes of black sand and lava blocks. Ahead of us crystallike bubbles rose from between several large boulders. We swam closer and I started filming this rather curious event. Suddenly, there was a violent hissing and popping noise and incandescent lava spurted out of a lava outcropping about six feet away. The noise became a roar as a large, bright hole appeared in the boulder and molten lava came pouring out. Instinctively I pointed the camera at the eruption and started to film. The water turned unpleasantly hot for the few seconds that the flow continued. Then the noise stopped and the lava cooled and solidified into a large pillow-shaped blister. Although I was far too excited to realize it at the time, we had just witnessed the formation of pillow lava. Soon the noise started again and a long narrow crevice appeared on the slope above us: Red molten lava appeared along the fracture line. A cloud of steam rose from the crevice. I swam toward the eruption through newly heated water but before I could start filming, the lava cooled, leaving a long, thin gray scar on the rock. The rumbling noise continued—sometimes augmented by hissing and popping. Now only about 20 feet below the waves crashing at the surface, we were pushed back and forth by the surging



water filled with black sand to where lava reaches the sea.

Glowing red hot, molten lava pushes through a crack in a pillow formation as a diver swims overhead.

Underwater fireworks

sea. New holes and crevices appeared in the rock wall and molten lava poured forth. I filmed the undersea eruptions whenever I could move fast enough to get close to them in the two or three seconds before the lava cooled. Jim, Rick and I were bounced by the surge against the rock wall and each other. Sometimes I would reach toward a rock outcropping for support and find it too hot to hold. We watched and filmed the undersea lava activity for about five chaotic minutes. Then, knowing that I must be running low on air, I motioned to Jim and Rick and the three of us headed down and away from the erupting slope into the calm and quiet deep water.

The lava flow from Mauna Ulu into the sea ended several days after our dive. Back in California, Jim Moore began to analyze my film. The few minutes that we had spent observing and filming the undersea lava activity had provided enough data for him to reach important conclusions.

He explained that part of the black surface in the area that I had taken for solid rock was in reality only a thin crust of solidified lava on a submarine lava tube. Beneath the crust was molten lava which had flowed from the volcano to the sea and had somehow worked its way beneath the surface. As the lava cooled underwater, it crusted over on the outside. The crust slowly thickened, but even the initially thin crust was sufficient to insulate the hot lava inside from the cold water. Hence the molten lava cooled more slowly and the crust remained thin for several hours.

Occasionally, the pressure of the molten lava inside the tube would crack the thin crust open. Molten lava would extrude from these cracks and form a blister or pillow on the tube. As the pillow cooled, it too crusted over. It looked like a black boulder but remained attached to the crust from which it had emerged. A tube joined the molten lava inside the pillow to the lava reservoir from which the pillow had been extruded. Sometimes the pillow itself would crack open and a second pillow would grow from that crack. Although the second pillow grew from the first, most of the lava came from the main lava tube below. It seemed likely that pillows might grow out of each other until their crust thickened enough to close off their connecting tubes. Clearly, the early ideas in which each pillow was thought to form as a distinct and isolated entity did not apply—at least not to our observations. But there were many questions still to be answered. What caused the rumbling, hissing, and popping sounds? How had the tube of lava at a 100-foot depth worked its way 30 feet across a sandy bottom?

Eighteen months later Rick Grigg and I again looked shoreward from our boat as a majestic cloud of steam rose from the sea cliffs. Lava from Mauna Ulu was again entering the sea about one mile to the west of last year's flow. The cloud of steam—enveloping about 100 yards of the sea cliff—was blown westward by a 20-knot wind. At the east end of the cloud we could see a single lava stream entering the sea. Many other streams and falls were hidden by the steam. Watching the steam drift upward in thick clouds, I knew that this lava flow was far heavier than last year's. Today's dive would be an entirely different experience.

The water felt like a hot bath

Our boat tossed on a very choppy sea. The water took on a dark yellow tinge several hundred yards from the steam cloud. Rick yelled, " Put your hand in the water!" I stared at him, uncomprehending. I obeyed. Our boat was more than 100 feet way from the steam cloud and yet the water felt like a hot bath. The water had to be hotter closer to shore and unbearable near the undersea lava activity. I immediately lost all interest in diving.

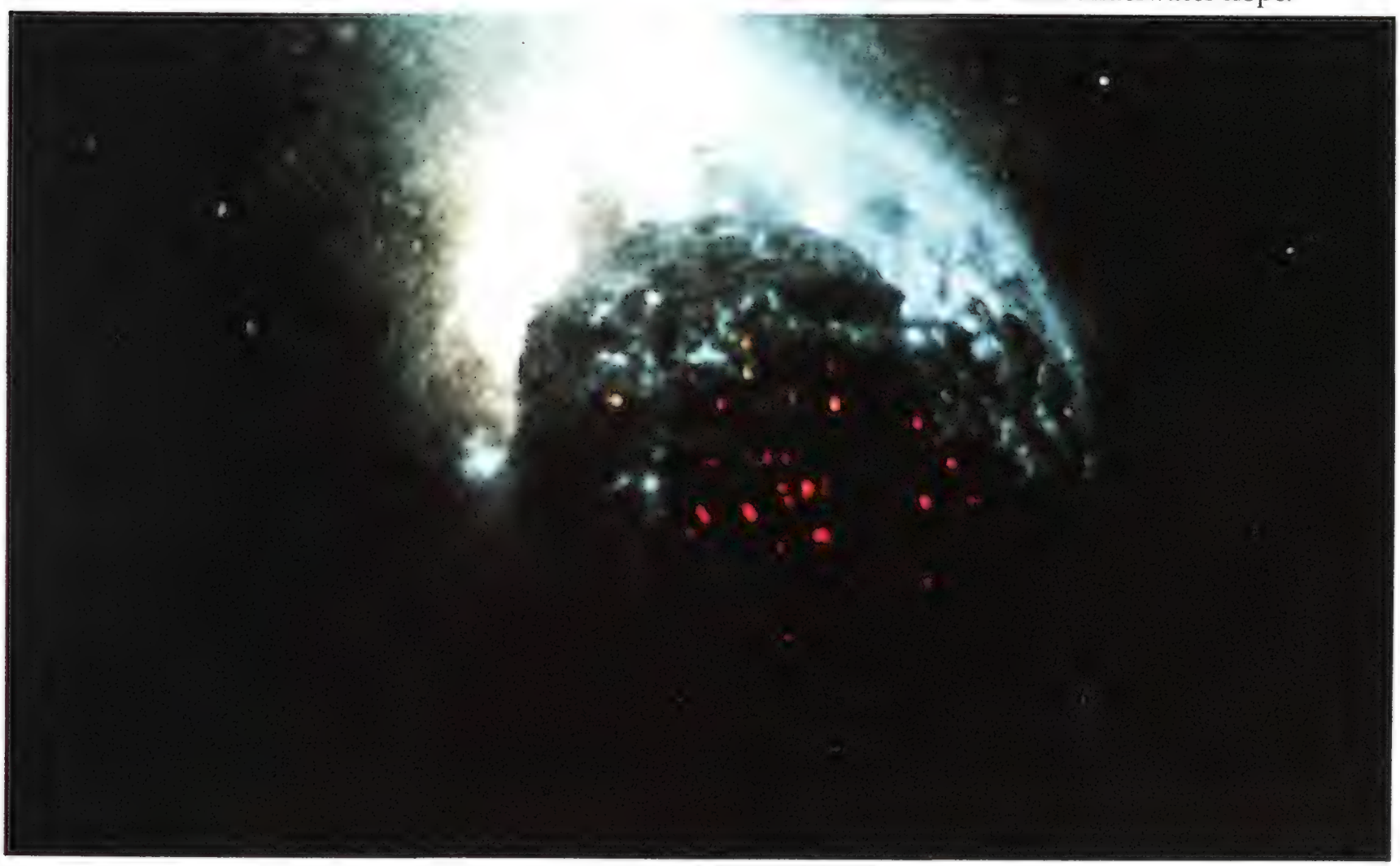
We moved the boat about 50 feet farther from the cliff and the water temperature dropped to lukewarm. Rick volunteered to dive and scout the area. After two quick dives, he reported that the hot water was confined to a thin surface layer. The water was dirty all the way to the bottom, 175 feet below, but while he had heard roaring and rumbling sounds, he had seen no lava activity.

Seeing that Rick had survived two dives, I entered the water. The hot water felt unnatural. Looking down, the visibility was zero. The sea was choppy and water continuously came down my snorkel, leaving a sickening sulfurlike taste in my mouth. In the rough

A producer of underwater scientific films, Lee Tepley has his own company and works part-time at the Lockheed Palo Alto Research Laboratory.

Born in violence, a pillow is formed as molten lava is extruded through glowing crack in thin shell.

A still glowing pillow that has broken free trails steam as it tumbles down an underwater slope.



Underwater fireworks

water I could not keep Rick in sight although he was only about 20 feet away. Fighting an urge to climb back into the boat, I struggled toward him. We made contact and dived not far from where Rick had just dived. The water was clear and calm. Reaching a depth of 50 feet, we found large numbers of tropical fish gliding through a rich coral garden. Swimming up along a steep wall, we encountered a dense cloud of yellow and black particles. We were swimming along the lower edge of the cloud when suddenly I heard a loud rumbling and saw for the first time how tubes form underwater. A lava tube was slowly moving down the coral covered slope. A crack opened near the lower edge of the tube; lava spurted out and down. In a cloud of steam it cooled and solidified. Another crack opened and the pattern repeated. With each new eruption the tube grew longer. It was really a series of pillows lying end to end. Just then my camera jammed so Rick and I returned to the boat for another one. Back in the water, we circled the edge of the yellow-black cloud and swam toward the cliff at a depth of about 20 feet. Suddenly we found ourselves in the midst of an underwater fireworks display. Incandescent red crevices opened suddenly on the side of the rocks. Lava flowed rapidly out of the crevices to form pillows. Sometimes the pillows collapsed in a cloud of bubbles and steam as the pressure of the water overcame the pressure of the expanding volcanic gases within the pillow. Shock waves from the implosions drove us backward.

For about five minutes we watched and filmed the growth of an almost animal-like structure. First a crack appeared on the top of a large boulder. A pillow grew upward. As the lava hardened it came to resemble the head of a gorilla. Other pillows, extruded from the large boulder, took on the appearance of shoulders and arms. Many of the pillows imploded, but they were soon replaced by others. As time went on, pillows continued to grow from each other. The mass became more complex and eventually lost its gorilla features. Many of the pillows were almost spherical in shape. Finally the activity ceased.

Rick and I moved downward along a steep lava slope. In some places the slope was almost a vertical wall. Sometimes cracks appeared in the wall and the emerging lava flowed rapidly outward. Gravity pulled the still fluid lava downward faster than it could cool. For a few seconds the lava would flow red hot like an incandescent waterfall. Then it would cool and form pillows. Some of these would attach themselves to the wall. Others would break away and fall free. Some would probably tumble all the way down the slope and end up on the sandy bottom.

Lava pillows and tubes on uplifted land were a puzzle until divers watched them form underwater.

Tubes not recognized

Later I asked Moore why field geologists studying uplifted pillow lavas had not recognized the tubes connecting the pillows as an essential clue to their formation. He pointed out that geologists on land usually look at two-dimensional outcrop surfaces cut through uplifted pillows and nearly all such surfaces show the tubes in elliptical cross section. The few tubes that are recognizable as such might easily have been dismissed as rare and unimportant anomalies.

Perhaps, then, it was not surprising that most of the early observers had misinterpreted the appearance of imbedded pillow lavas and had concluded that each pillow formed as a separate and distinct entity. We had

in fact observed that some pillows broke away from the surface from which they had been extruded and henceforth led isolated existences.

We cannot rule out the possibility that under different conditions pillows might form in ways different from what we had observed. The mechanisms suggested by earlier workers might possibly occur in extremely heavy lava flows into the sea, or, perhaps, in volcanic eruptions on the ocean bottom. Still, the process of pillow growth that we observed in Hawaii seems adequate to explain the occurrence and appearance of most pillow lavas.

Last summer, Moore participated in Project FAMOUS (French-American Mid-Ocean Undersea Study) as a diving scientist. Through a porthole of the submersible *Alvin* he observed and filmed the ocean bottom in a rift valley along the Mid-Atlantic Ridge at a depth of about 8,000 feet. The location was selected as one of the areas where undersea volcanic activity was most likely to occur. Not surprisingly, pillow lavas were the most common lava he saw. They were no different in appearance from the pillows we had watched originating in shallow water.

Almost six months and two expeditions after our second dive, I finally succeeded in filming the formation of an undersea lava tube—but the expedition almost ended in disaster. Moore and I observed a lava tube moving down the slope at a depth of about 80 feet. With a feeling of real accomplishment, I filmed the entire process. I then followed Jim along the lava slope. He stopped to observe the formation of a small pillow. Suddenly the slope exploded directly beneath him. He floated limply upward but recovered quickly. Badly shaken, we both ascended to the surface. He told me later that he had been stunned for a few seconds. If the concussion had been any greater, we both might have lost consciousness. We don't know the cause of the explosion. We have no idea how often such explosions occur or how intense the concussions might be. I suspect that if we had encountered a comparable explosion on our first expedition, we would not have gone back for a second look.

Since that last expedition there have been no more flows into the sea from the Mauna Ulu vent. There is enough potentially important scientific data still to be filmed to justify many more dives—but I have mixed feelings about taking part in future expeditions. The conflict is whether to stop while ahead or to risk again the fiery undersea eruptions. I suppose that I will not finally decide until lava again flows into the sea.

A cascade of molten lava arcs off a cliff into the sea after traveling seven miles across land.

900 A.D. An architectural wonder at Chichén Itzá.

600 A.D. Face of Classic Mayan woman.

1,000 A.D. Ball Court, Chichén Itzá

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1975. Cancún's hotels honor the Mayan past.

1975. A friendly Mayan welcome.

1975. Tennis courts, Cancún.

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The new 1,000-year-old world on the Mexican Caribbean.

Theodore Labrouste's vision, 1831, of a restored Temple of Hercules at Cora, Italy, is embellished by garlands, weapons and murals, all enhancing Republican Roman religion.

By Russell Lynes

A grand school of academic design is reexamined

Derided and scorned for a half-century, the once powerfully persuasive Ecole des Beaux-Arts is now given a repentantly retrospective review

For nearly 60 years, *Beaux-Arts* has been a dirty word in the vocabulary of modern architectural doctrine and teaching. The Ecole des Beaux-Arts in Paris has been looked upon as the enemy of all that was functional, and hence not only against 20th-century advances in building technology but also against the social purposes of architecture. It has been anathema to those who believe that all (or nearly all) social evils could be cured by the proper design of buildings and by urban planning. No one 40 years ago was more eager to dispatch the Beaux-Arts or more sprightly in dancing on its grave than New York's Museum of Modern Art.

Now this museum, which has a gift for anticipating shifts in taste as well as hastening their acceptability, has decided that the moment has come to resurrect the Beaux-Arts and display its virtues.

For the next two months, by what might almost seem an act of contrition, 200 works by students of the Ecole, most of them from the 19th century, will ornament (I use the word advisedly) the museum's galleries with renderings made for school projects and prize competitions. (The show travels to Paris early in 1976.) They are beautifully executed, imaginatively conceived and today impossible of construction. Included with them are drawings for the Bibliothèque Ste.-Geneviève by Henri Labrouste and for the Opéra by Charles Garnier, both Paris landmarks that signaled eruptions in architectural invention and taste. There are also several dozen photographs of 19th- and early 20th-century American and French buildings which, in the museum's words, "reflect Beaux-Arts ideas applied to practical problems."

It was the Modern that, in 1932, held the first exhibition in America of "Modern Architecture" and launched what it called the "International Style." The show (models, photographs and plans) circulated widely throughout the country, making converts and enemies—to some a breath of fresh air and excitement, to others an assault on all they considered beautiful in architecture.

"Now the modern movement is 60 or 70 years old, and it is running down," according to Arthur Drexler, director of the museum's department of architecture and impresario of the exhibition. "It has eluded criticism of its basic assumptions. It is tired and it has no compelling doctrine to inspire it, as it did in the days of the 'Modern Architecture' show. It has created individual masterpieces, but it has failed disastrously in urban planning. The purpose of the Beaux-Arts exhibition is to invite reexamination of its principles and rationale, to which we owe something."

We owe it a great deal—some distinguished buildings and many tawdry ones—for the teachings and influence of the Beaux-Arts, sometimes remotely and crudely applied, are nearly everywhere in America. They provided the ornamental envelopes and plans for all manner of buildings, from the great public libraries of Boston and New York to the columned and pedimented county courthouse of Texas. Bankers go about their business behind Beaux-Arts facades, the rich lie buried in Beaux-Arts mausoleums, legislators caucus in Beaux-Arts office buildings in Washington, and art lovers climb the marble stairs of Beaux-Arts museums from Baltimore to Seattle. From the 1860s to the 1930s the Beaux-Arts traditions dominated public building in America and some domestic building, just as it did in Paris.

The Beaux-Arts tradition

The first American to enter the Ecole des Beaux-Arts was Richard Morris Hunt in 1846 at the age of 18. It happened that he was living in Europe with his mother and his brother, the painter William Morris Hunt, when he decided to pursue an architectural career, and since there was no such thing as an achitectural school in America at that time, he took the obvious course. In so doing he set a precedent which was followed well into the 1930s, and what he studied and how he was taught changed very little in those 80-odd years. If today you should ask an architect who studied at the Ecole as a young man to describe to you what it was like in the 1930s, as I recently had occasion to, you might just as well be listening to Hunt and

Comparatively classic staircase for an imagined palace. Emmanel Brune's style is considerably

his contemporaries. The methods of instruction were the same, the entrance requirements had scarcely changed, and the *concours,* or prize competitions, around which the life of the students was set demanded the same methods of approach and the same long hours of sweaty toil.

The Ecole des Beaux-Arts, whose principal building still looks from the Left Bank of the Seine toward the Louvre, had been the center of architectural instruction, theory and often acrimonious dispute since it was established in 1816. The school charged no tuition and any young man between the ages of 15 and 30 could enroll—if, that is, he was able to get himself attached to one of the ateliers or workshops presided over by a master architect (called a patron) and eventually pass the entrance examinations required by the school. Women were not accepted for architectural study until very late in the 19th century. Hunt was 18 when he was admitted to the atelier of Hector-Martin Lefuel, and he took the usual three years to prepare himself for the examinations in mathematics, descriptive geometry, drawing and architectural design. During those three years he was called an aspirant; he could use the library of the Ecole if he wished, and he could go to the lectures, though except for those in construction they were not conscientiously attended. Once he had passed the examinations, he could call himself proudly an Elève de l'Ecole des Beaux-Arts, and his life centered on the competitions set up by the Ecole, for his progress depended on how well he performed in them.

It is a temptation in looking at the renderings of the competition winners (and they were the work of the most advanced students competing for the most

Noted author Russell Lynes last wrote on the Hirshhorn Museum for SMITHSONIAN, *January 1975.*

less exuberant than Louis-Hippolyte Boileau's 1897 casino (below), complete with grottoes.

coveted prize, the Prix de Rome) to say that they are all show, all surface and all fantasy, but the Ecole was rigid in its insistence on sound construction. "The walls of a monument," said the patron and esthetician A. L. T. Vaudoyer in 1832, "are only its natural envelope; they are to the edifice that they enclose what drapery is to the statue it covers." The students struggled with the skeleton as well as with the flesh and the "drapery," and they were required before they could advance to the major competitions to master the detailing of wood and stone and iron and the mathematical calculations that would demonstrate their practical knowledge of what makes a building stand.

Rigor of the ateliers

It was up to the individual student to decide at how leisurely or frantic a pace he would progress through the Ecole's requirements. He could enter as many competitions as he wished, but once he chose to compete he was committed to a strenuous exercise of wits and labor. If a student wanted to enroll for a *concours,* he signed his name in a register in a special building where the preliminaries took place, and he was presented with a copy of the program he was to develop. It could be a facade or a plan of a small school, a town hall, a fountain or a detail of a building. He was then given a cubicle in which to work for 12 hours, during which he developed a scheme and made a preliminary sketch of his project. When he left the building, he gave his sketch to the doorman and took a tracing of it back to his atelier for his patron and his fellow students to criticize. When he finally completed his drawings and submitted them, they were judged by a jury of professors of the Ecole. If the final drawings were not a reasonable development of the original submission, but took off on some different tack, they were thrown out. In other words, what he did in those first 12 hours was to create a vision; the rest of the work went toward developing and refining it.

A few of the dozen or so ateliers were in the Ecole building, but most of them were satellites, clustering in ancient buildings near the school. Some were small with just a student or two, but in the largest ones sometimes 60 or even 80 young men worked in wretched quarters by the light of candles or oil lamps. In almost every case the patron had been a winner of the principal prize for which the students of the first classes competed, the Prix de Rome—which only one student a year could win, and which provided a stipend and four or five years at the Académie Française in the Villa Medici in Rome.

Life in the ateliers was not one of continual pressure but of a series of almost manic-depressive cycles—

periods of euphoria and sleeplessness and frantic activity and days of sluggishness. The students worked not only on their own projects, but as the deadlines for the principal competitions loomed, they worked for their elders and betters—one on rendering capitals on columns, for example, one on some sort of repetitive ornament like egg-and-dart moldings, one on tracing and inking—day and night until the complete elevations, sections and plans were rendered in all their elegant detail and faultless draftsmanship. During the intense time of preparations they were said to be *en charrette,* literally "in the cart," for when the drawings were finally completed the students trundled them in a two-wheel cart to the Salle Melpomène where the judging for the Prix de Rome took place under the usually aged eyes of members of the Académie des Beaux-Arts.

"I learned as much from the other students as I did from the patron," my architectural acquaintance said to me, and this seems always to have been true. When the patron (it was a friendly term equivalent to "the boss") visited the atelier dressed in his elegant clothes (his architectural practice was elsewhere), the students followed him from one drafting table to the next, listening to his quick, incisive criticisms and suggestions, which were addressed more to the group than to the man at whose work he was looking. "Having made the rounds," as a student reported at the turn of the century, "he would bow, put on his silk hat, and quietly leave the room, but no sooner was the door shut than pandemonium would break loose. . . ."

Since each student could progress more or less at his own pace, Hunt, like many others before him and since, spent a good deal of his time traveling about Europe, making drawings of buildings he admired which were to contribute largely to his later success, when he took to imitating chateaux and princely palaces for the Vanderbilts of New York, Newport and Asheville. Travel was as much a part of the students' training as their work for the Ecole or as time spent in disputes over matters of style and esthetic theory.

"The Beaux-Arts," as an essay in the elaborately illustrated and scholarly book that accompanies the exhibition says, "is neither as monolithic a structure nor as homogeneous a system of design as its classical appearance would lead one to believe." Indeed, the sacrosanct principles of the Beaux-Arts suffered occasional upheavals of explosive force. When young Henri Labrouste went off to Rome with his stipend and instructions to examine and draw from the monuments of the ancients, he sent back to Paris a reconstruction of the Greek temples at Paestum, a site south of Naples, interpreting them so differently from the accepted beliefs that he was not only accused of "error," but, as Drexler, paraphrasing Viollet-le-Duc, put it, of "disrupting the state, religion and the sanctity of the French family." The students at the Ecole, on the other hand, were delighted and paraded him through the streets when he returned to Paris. Schol-

Detail of railway station, work of Jean-Camille Formigé, a prize winning design of 1876.

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EXXON

Polychrome decorations and Gothic styling were highlighted in Julien Guadet's Alpine hospice.

ars now credit Labrouste with launching in architecture the counterpart of the Romantic movement in painting and literature and a style called "Neo-Grec," freer in its uses of forms than those based on Roman architecture and on the Italian Renaissance.

Hunt left Paris in 1855 and brought with him to New York the whole Ecole bag of tricks, a preparation for embarking on his profession that no American could match. He was followed at the Ecole by a gradually increasing stream of aspiring young Americans. H. H. Richardson, who escaped the mannerisms of the Beaux-Arts but absorbed its essential concern with planning for site and function, was in Paris in the 1860s. Later came Charles McKim, whose firm, McKim, Mead & White, built the Boston Public Library and New York's Pennsylvania Station; John M. Carrère and Thomas Hastings, who won the competition for the New York Public Library in 1897; Whitney Warren of Warren & Wetmore, architects of Grand Central Station; and so on, right up through Raymond Hood, whose works included Rockefeller Center. But so far as the public was concerned, it was the Columbian Exposition in Chicago in 1893 that made the glories of the Beaux-Arts the do-all-end-all of architectural magnificence.

No Americans, indeed nobody anywhere, had ever seen anything like the "White City," as the Exposition was called, which rose glistening on the shore of Lake Michigan. In three years a swamp had been made into a magical lagoon filled with fountains and swan boats and ringed with frosty temples of industry and agriculture and commerce. Commanding the position of honor at one end of the lagoon was Hunt's Administration Building, domed and becolumned and fringed with sculpture. From the other end a statue of Columbia, 65 feet high, gazed at this glorious confection.

These "cloud-capped towers and gorgeous palaces," as one writer called them, were to cause grave doubts about the future of American architecture in the hearts of a few critics and a few architects who disagreed with Daniel H. Burnham, who was in charge of the plan for the fair. He had said. "The influence of the Exposition on architecture will be to inspire a reversion toward the pure ideal of the ancients." Louis Sullivan said of this imitation classicism that he found it ridiculous "in a land declaring its fervid democracy, its inventiveness, its resourcefulness, its unique daring, enterprise and progress," and he prophesied that "The damage wrought by the World's Fair will last for half a century from its date, if not longer."

The critics were right in some degree. The Fair did indeed lead to all manner of imitation; it did inspire a "reversion toward the. . . . ancients" if not toward "the pure ideal," and it certainly hung on for nearly half a century in the design of official, academic, religious and commercial buildings, and in much domestic architecture as well. The threat was to the development of an architecture that expressed the new technology rather than concealing it behind Beaux-Arts ornamental facades.

French vs. American

Within the fraternity of architecture there was another and more private dispute that caused practitioners and teachers to choose sides, not necessarily opposite ones. In 1907 the *Architectural Record* opened its pages to a debate over the virtues and evils of "the methods of modern French architecture as applied to architectural practice in the United States." There was not an architectural school in America of any consequence that did not have a Frenchman or a Beaux-Arts trained American at its head. There was scarcely a firm of any importance that did not make much of its members who had studied at the Beaux-Arts. The first successful architectural school in America, at the Massachusetts Institute of Technology, was organized by Hunt's pupil, William R. Ware, on Beaux-Arts principles and methods. All of this was looked upon as having been of very great importance in putting order into a floundering and disorganized profession. But by 1908 it seemed to some too much of

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a good thing, the principles and practices too remote from American needs. Too many architects, according to A. D. F. Hamlin, then the head of the architectural school at Columbia University, "have been dazzled with a false glamor, or bewitched by the artistic jargon and cant of the ateliers, into glorifying the superficial and the external, and forgetting the eternal and fundamental principles which give whatever is valuable to their foreign training." He inveighed against "cartouche architecture" and "architectural trickery."

But the stream of American students continued to flow to the Ecole des Beaux-Arts, and an organization called the Beaux-Arts Institute of Design with headquarters in New York conducted annual competitions whose winners received the Prix de Paris. But, as we noted at the outset, Beaux-Arts (always pronounced as one word—bozar) became an epithet, and in 1956 the Institute made this official by changing its name to the National Institute for Architectural Education to avoid the stigma. The Institute continues to sponsor competitions and give prizes to students, but there is no money for study at the Ecole on the Left Bank. The Ecole, has, indeed, been decentralized and "reformed" as a result of student uprisings in 1968. The students had decided that the Ecole was overwhelmingly cramped and crowded and could no longer prepare them for the role that they were expected to perform on a 20th-century stage. André Malraux, De Gaulle's cultural minister, saw reason and virtue in their disenchantment and speeded the reforms.

Styles of architecture are likely to run out of vitality long before they go out of fashion, but the principles of style are apt to remain essentially constant. "Truth is the first requirement of architecture," wrote Julien Guadet, the great theorist of the Beaux-Arts in the later years of the 19th century. "Every architectural untruth is inexcusable." He also said: "A design must be good first (that is, it must be functional), but it must also be beautiful." No modern architect will quarrel with that. It is architects who, by devising a visual language (a style, that is) that speaks for their own times, change the meanings of "truth" and "beauty," and fashion and taste tag along. One generation's purity becomes the next generation's sterility, or so the history of architecture seems to demonstrate. The clock of taste has been ticking slowly since Modern buried Beaux-Arts and, as it always seems to do, its pendulum has swung away from the imperturbability and austerity of functionalism to a romantic itch for sensuousness and outspoken delight.

This commanding version of a restoration of the Parthenon was the work of Edouard Loviot.

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Seen from its sister village, Shipaulovi, the ancient pueblo of Mishongnovi glows in the late afternoon sun.

A rare glimpse into the evolving way of the Hopi

By James K. Page jr.

An Arizona tribe whose name means "peace" struggles to keep its privacy intact and its ancient ways in balance with modernity

Alonzo Quavehema stood on the edge of a flat-topped rocky mesa that bears the stone and cinder block houses of Shipaulovi, one of 12 pueblo villages of the Hopi located on an area of some 600 square miles in the midst of the mammoth Navajo Reservation in northeastern Arizona. Alonzo was looking west across the desert some 800 feet below him to another spur of what is called Second Mesa jutting out into the scrub like a great armored ship two miles away. Scattered over the distant mesa top were more houses and a water tower glinting silver in the late afternoon sun. Alonzo explained to me how he had come to live here in the pueblo of Shipaulovi.

"My people went over there first, to Shungopavi. We came up from the south, near Winslow, and asked if we could live there. They couldn't decide for a long time if we could join their village. We told them all the things we could do to help. We were warriors.

Photographs by Susanne Anderson

Alonzo Quavehema, resident of Shipaulovi, affixes feathers to rattle in preparation for Butterfly Dance.

We would be their guards. Finally they decided that Shungopavi was too crowded already so they told us we could come over here. They said they would send a Bear family with us to be our leaders. The Bear clan is traditionally the clan of the Hopi leaders. We were no clan then, coming from the south.

"So we came over to this mesa one day and just as we got here the sun was coming up. It was just showing its forehead, you know. So they made us the Sun Forehead clan."

These events, which Alonzo recounted with some of the familiarity of a participant, took place about 600 years ago. There are more recently established Hopi villages, and there are older ones: Old Oraibi, some 12 miles northwest of Alonzo's home, is the oldest continuously inhabited settlement in the United States, having been established about 1150.

There is a sign posted outside Old Oraibi which I saw on my first visit to the Hopi. It says: "Warning. No outside visitors allowed. Because of your failure to obey the laws of our tribe as well as the laws of your own, this village is hereby closed."

I began to sweat when I saw this message. What kind of society is so old, so uninterested in me, that it could confidently erect so stern a sign? From that time on, driving to less exclusive villages, meeting Hopi, and walking around the scrub on the mesa tops, I treaded lightly as if I was in another man's church—which of course I was, everywhere I went. I found, as others have, a society which has long focused its attention and led its relatively quiet life inwardly, not taking any special notice of, or interest in, the white society that bustles all around it. Ultimately I stayed in the village of Shipaulovi.

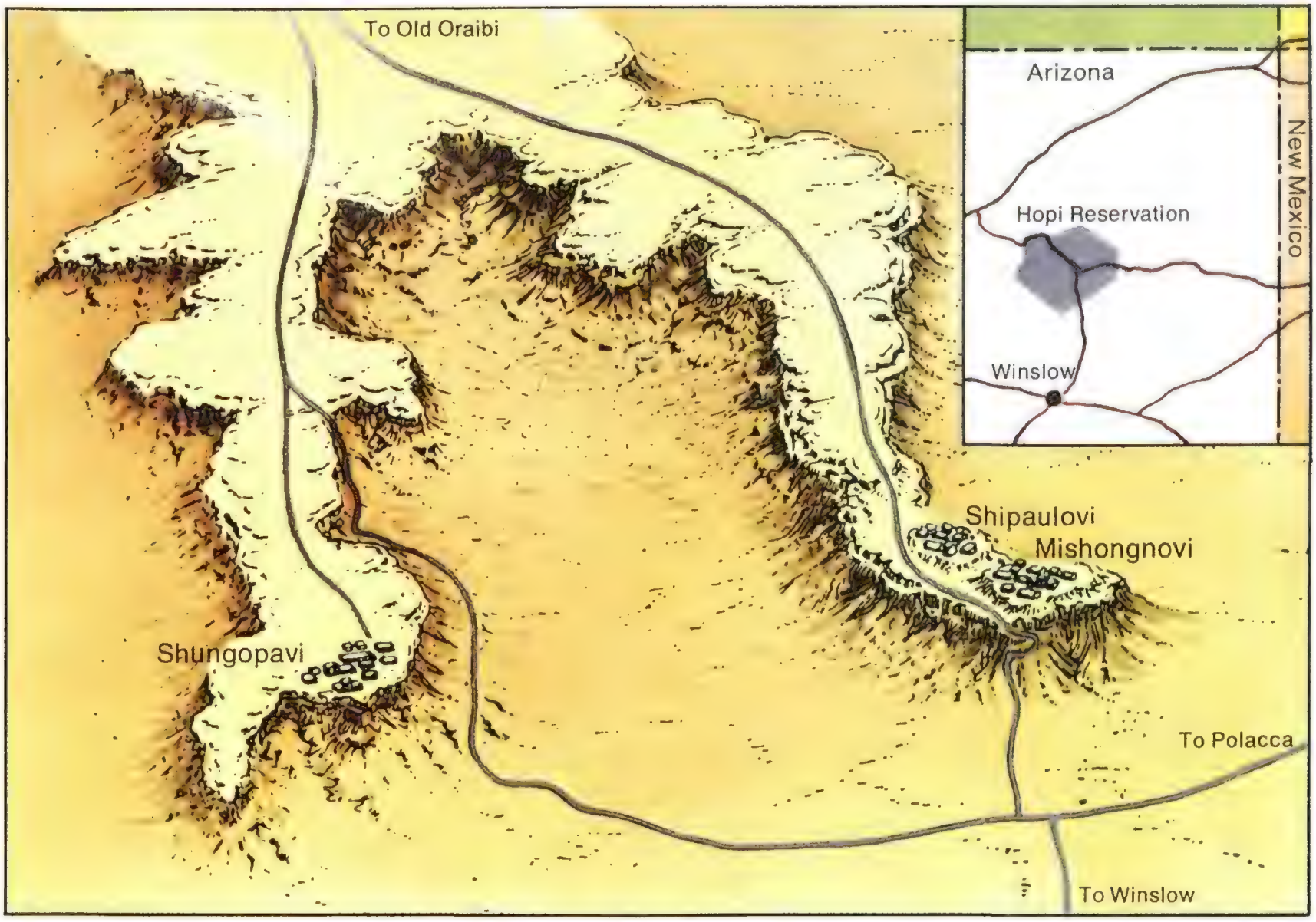
Today most of Shipaulovi's inhabitants are still of the Sun Forehead clan. There are some Bear people (from whom the village leaders still arise) and several other clans are now represented, including the Tobacco clan which is that of Alonzo's wife, Linda, and therefore of their six children. Each of the 50-odd Hopi clans has a specific function: Linda's clan is required to provide religious societies with Hopi tobacco, an herb that is collected from the surrounding desert and cured in the shade. (If it is cured in the sun, it becomes *very* strong, Alonzo told me, laughing about a recent incident when he became dizzy and a little silly after a sun-cured pipeful.)

In addition to specific functions, the clans provide each Hopi with another set of relatives. I was baffled by the constantly expanding number of sisters Linda introduced me to until she explained that all but one were of the Tobacco clan. And it gets even more complex. For example, one afternoon we dropped off Alonzo's battered red and white Chevy pickup at the house of a man named Elwyn so that he could replace the worn-out rear brake shoes. It was sufficient explanation for this favor that Elwyn's father was of the Eagle clan and so is Linda's father. That makes Linda and Elwyn sister and brother.

"We are almost all related to each other," says Linda, "one way or another." There are about 7,000 Hopi (at last estimate 5,500 live on the reservation, but this number grows as more and more Hopi return to the mesas from the white man's world). That's 7,000 relatives, one way or another, a tangle of kinship and clan connections that has been poked at, peered into, listed, analyzed and generalized by nearly a score of hawkshaw anthropologists in the last half-century. And in the manner of anthropologists everywhere, they all seem to disagree vigorously over the details, but there is general agreement that the clan system is one of the forms of social glue that historically have held the separate Hopi villages together. For until the 1930s there was no Hopi tribal government, only a loose confederation of politically independent pueblos, knit by basically similar mythology, religious beliefs and ceremonial practices, and by web within web of kinship.

Political engineering

In 1934, the United States Congress passed into law the Indian Reorganization Act, requiring that Indian tribes adopt constitutions calling for the election of tribal governments. A large number of Hopi, distrustful of anything emanating from Washington and comfortable with the traditional system of village leaders (called kikmongwis), simply stayed home when it came time to vote yea or nay on the Washington-authored Hopi constitution. Thus the yeas carried the day and



Three villages are perched high on the escarpment of Second Mesa in the center of the Hopi Reservation.

Shipaulovi and Shungopavi each claimed land on the desert (to right of the Winslow Road) as its own.

a thoroughly foreign political system, consisting of village representatives to a tribal council, was awkwardly superimposed on (it did not replace) the Hopi village governments.

An entirely predictable result of this political engineering was to intensify the always simmering schism between those who are called traditionals and progressives among the Hopi. The schism goes to the heart of what Hopi themselves call the Hopi way, a unique and, by outsiders, much romanticized state of mind and life-style that puts one in harmony with all mankind, with the earth and with all its creatures. Hopi means peaceful, the peaceful people. And how does one pursue the Hopi way?

I was assured by one deeply religious and highly litigious Hopi that the key was not to go into financial debt in the manner of the bahana (white man). This man, a spokesman for the traditionals who have opposed virtually all projects emanating from the Tribal Council—be they highway improvement, electrification or the leasing of mineral rights—has the relative luxury of running water and electricity in his house. Another traditional leader, the governor of Old Oraibi, has steadfastly banned not only the white man but his electricity from the village. Other villages have taken a less devastating stand on white visitors, but many do erect signs requiring tourists to keep cameras, tape recorders and sketchbooks in their cars. While good-natured and friendly, the Hopi covet their privacy and have long refused to be photographed by tourists or professionals. "No cameras," even the children will shout at a protruding Kodak. "No pictures." (Susanne Anderson's photographs of the round of daily life were taken only after permission had been granted by the individuals involved.)

The main problem has been with insensitve attempts to sneak photographs of sacred Hopi shrines and ceremonies. It was the issue in August when the traditionals sought to close the snake dance to bahanas. But the snake chief of the village in question demurred, stating that the snake dance was traditionally a prayer for all mankind and should not be closed.

Who then were the true traditionals in this instance? Those who sought to close the dance to keep it pure,

or the old snake chief who refused to close it in the name of tradition? To an outsider—and even to the Hopi—the distinctions get murky.

On the other hand, Alonzo Quavehema is in many quarters considered a progressive. Forty-four years old, Alonzo is employed by the Bureau of Indian Affairs as a cook in the day school at Kyakotsmovi village. For six years he was a member of the Tribal Council, making him by definition a progressive.

He and his family live in a two-room house and a one-room adjunct on the eastern side of Shipaulovi's plaza, a dusty rectangle 36 paces by 15. Five other similarly quartered families live on the plaza where, on ceremonial days, the dances are held and where up to a thousand people may congregate, sitting in chairs around the plaza and lining the rooftops three or four deep. On ordinary days the plaza is quiet, most adults staying inside out of the heat while small hordes of children play in the dust.

Alonzo's one-room house, recently built out of cinder block, is lit by a Coleman lantern and an oil lamp. The other house, with foot-thick walls of stone and with earth piled on the roof for insulation, has electricity (on my first visit we watched the Steelers defeat the Bengals on the television set) but there is no running water. Twice a week, Alonzo gets water for drinking, washing and cooking from a windmill-driven pump five miles away on the desert and hauls it up the mesa in 50-gallon drums in the back of his wheezing pickup. From the truck the water is transferred, bucket by bucket, into the kitchen. A cluster of outhouses is perched in the rocks a steep 30 feet down the side of the mesa from the back door. The Cal Gas truck cannot make it around the last precipitous switchback on the dusty road that winds up to the top of Shipaulovi, so Alonzo hauls 200-pound propane bottles up the mesa from 16 miles away, and in the winter burns coal that he collects free from the Peabody Coal Company mine on Black Mesa—a five-hour round trip. It is not a particularly convenient way to live.

But for Alonzo and Linda, the Hopi way does not require one deliberately to avoid modern conveniences. They lived briefly in a 60-foot trailer on some desert land below the mesa.

"The kids got used to taking showers every day, sometimes twice a day," laughs Alonzo. But a strong wind blew the roof off and the family moved back to the mesa top. They plan to build a stronger house down on the desert when time and money permit.

For the Quavehemas, one thing the Hopi way does mean is ceremonies and fulfilling the obligations to one's relatives and neighbors that Hopi tradition has dictated for centuries. On my first visit to Alonzo's house, while he, his son Rob and I watched the football game, Linda made spiral-shaped plaques from yucca. They were to "pay back" the families of boys who had danced with Darlene, their 12 year old daughter, at a social dance. "Darlene is getting too popular," Linda complained cheerfully. "I spend all my time making plaques to pay back."

(Continued)

Alonzo's son, trained as a chef in Chicago, hauls drinking water across Shipaulovi's dusty plaza.

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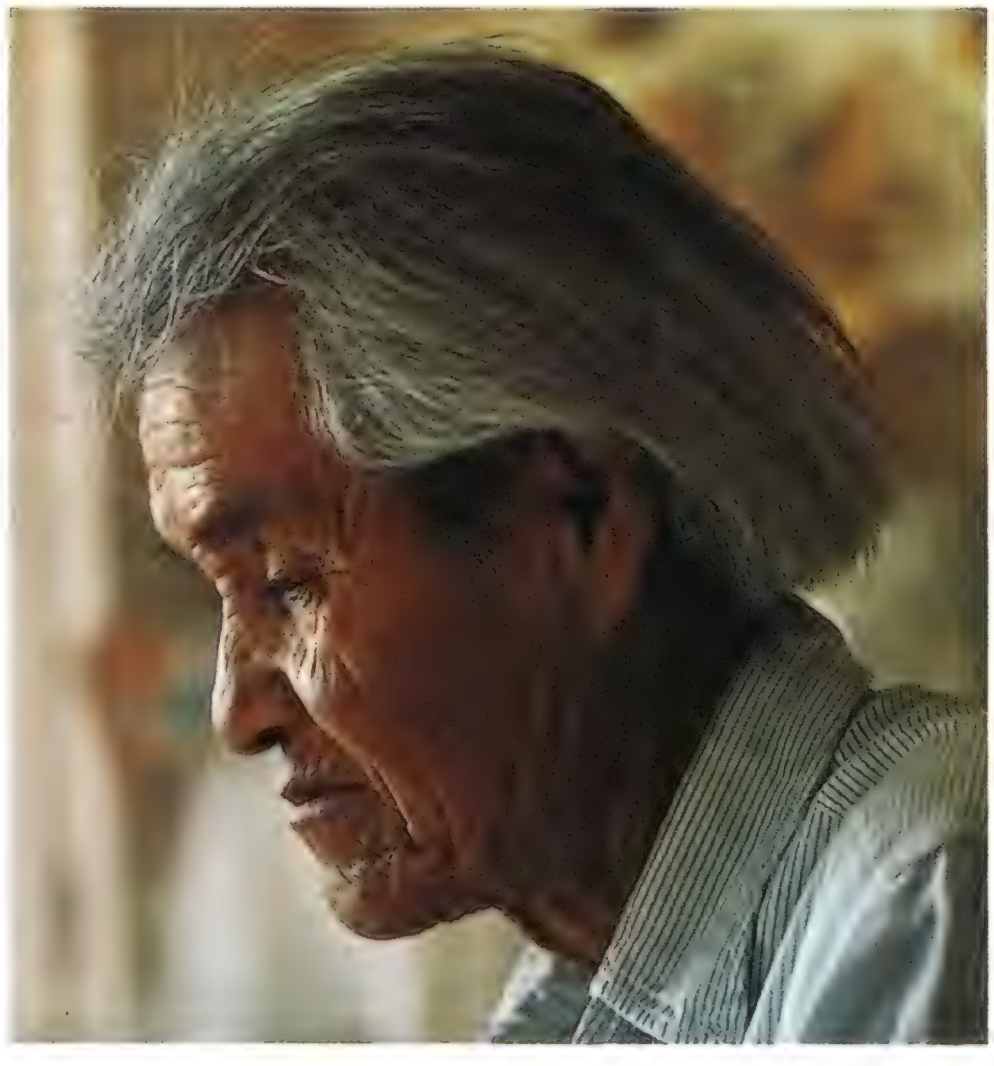
Across four generations: Alonzo and Linda's daughter Darlene holds aloft the newest member of family, a grandson named Wilson. Seen below is Linda's father.



Another time I arrived just as the second day of a two-day corn dance was getting under way in the plaza. In the course of the day, 60 people—friends, clan members and relatives—trooped through the house and sat down in the kitchen to be fed Hopi stew (hominy, precooked in ashes, and mutton), bread and coffee. Alonzo took part in the ceremony, which meant not only two days of dancing and chanting in the heat from 11:00 to 6:30, but a week of preparation beforehand in the evenings after work and staying up all night before the dance by way of purification.

In the course of the spring and summer, Alonzo took part in six or seven such ceremonies at his village and others, and he and Linda organized the wedding of their daughter Jan (entailing the preparation of vast quantities of food, with the help of neighbors, in order to pay back the husband's family which prepares the bridal clothes).

Most of the ceremonies in the spring and summer are to bring rain, to encourage the crops. The day after the corn dance I attended, Alonzo took a handful of evergreen branches worn by the kachinas down to a dusty wash east of the mesa where he had recently planted his spring corn. Little green shoots, about five paces apart and protected from cutworms by open-ended, rusty tins placed over them, dotted the sand. Alonzo lay the evergreens by one of his plants, where earlier he had placed some eagle feathers, and knelt to pray. I felt awkward just standing there and was, in a way, relieved when he stood and hoed up the few weeds that had managed to take hold in the sand.

"They use up the moisture," he said. "It's too bad to kill them but they use up the moisture."

"What moisture?" I asked.

Alonzo stuck his hoe six inches into the sand and turned it over. "There," he said. "You can see the sand is a little moist." All that I could see was dry sand.

Linda wraps leggings on Linda Mae for Butterfly Dance, Darlene waits turn and a tired Alonzo snoozes.

Daughter Linda Mae reaches for a soft drink.

At right, Linda makes bread from blue corn in the manner Hopi have used for a millennium.

In May, spring corn shoots barely peeked above the protective cans in one of Alonzo's fields on the desert.

"It's there," he assured me, laughing. Alonzo has four such fields which he tends after work at the school and in between ceremonies. He grows the six traditional kinds of Hopi corn along with cantaloupes, gourds and beans. Corn is traditionally the measure of wealth, Linda told me. A Hopi woman needs lots of it, for paying back and for feeding friends. I watched one evening as Linda finished shelling 75 pounds of blue corn, knocking the kernels off cob after cob by hammering them with a dry husk. Her hands were throbbing by nightfall but she kept on into the night, as the corn had to be ground into meal by the weekend in order to help a neighbor pay back her daughter's in-laws in another village.

"Here at Shipaulovi, we ladies all help each other. We all know who helps and who doesn't. A couple of ladies here don't ever help. I don't know what they're going to do if their daughters ever marry a Hopi man. They can't do it by themselves."

It was the end of Linda's blue corn from the previous year's crop. "I sure hope we get some more this year," she said, but Alonzo was not sanguine about it.

"Two years ago," he said, "we had good crops, lots of corn. But this year and last year . . . it wasn't no good last year, not enough rain. And this year we had to plant the spring corn in late April because it was so cold so long. In June, the water came down the wash and the corn didn't do so well. Lots of plants sort of rotted. Everything is late. We need rain."

In August it did rain—often, in tantalizingly brief showers here and there, but rarely in Shipaulovi. Every afternoon big, fleecy clouds would congregate on the horizon and turn gray. A dark ribbon of rain would connect the sky to the earth like a slow-motion stroke of lightning. And wherever it rained, the clouds would soon part and the sun would come out and dry the land so quickly that within a half-hour all that was left were a few puddles along the roads and a slight smell of moisture in the air.

Alonzo, the progressive, groped for reasons for the bad weather. He asked me if the entire United States climate was changing. He recalled when large stretches of the desert were green with Hopi corn and melon vines and peach orchards, when the warm growing season was two months longer than now. And he suspected that the bad weather of the last two years was impelled not so much by climate change as by something deeper—a breakdown in the traditional Hopi way, a dispute between his village and Shungopavi on the mesa to the west, and the bad thoughts people were harboring as a result.

The dispute was over housing. The village of Shipaulovi was growing—there was no more room on the mesa for the additional houses needed as its population of 200 grew. The Hopi Housing Authority (of which Alonzo is one of seven members) had arranged, with U.S. Department of Housing and Urban Development funds, to build 21 houses on a strip of land below the mesa along the road to Winslow. The strip of land was to be leased from the village of Shipaulovi. But Shungopavi, on the western spur of Second Mesa, also claimed the land. Several times the elders had publicly sought to stop the housing project on the basis that the land was sacred.

When I first met Alonzo, I asked him about the disputed land. He pointed to it, down on the desert floor. He then pointed to the boundaries of Shipaulovi's

In August, each plant bore about six ears of corn, though in a good year the crop would be better.

Hopi carpenters finish an addition to a house in Shipaulovi, which seeks to expand to the desert below.

land which, he said, extended south on either side of the strip in question "as far as you can see, to the border of the reservation."

It was not sacred land, so far as he knew. "Except one day each year," he said, "when the snake priests go out in the desert to get the snakes for the snake dance. You can't be there then. If they catch you around, they can fine you—or make you take part in the dance.

"I understand what the traditionals are worried about. They believe if we build those houses down there, like bahana houses, then we'll become bahanas. We'll lose all our Hopi ways. And those are all we have, our old ways. They are unique and they are ours. Here at Shipaulovi we try to keep the old ways, we do all the ceremonies, the dances. At Old Oraibi and some other villages, they don't do most of the dances anymore.

"It's so hard," he went on after a pause. "It's hard to know where it will all end. The ceremonies are for the crops, for rain; but the men here, most of them have jobs so our fields are small, we have few fields now because there is no time. I don't know."

In May, Alonzo told me the housing problem was all settled, that the water pipes were being laid. But during the summer the matter erupted again.

When I arrived in August, Alonzo was exhausted from two days and nights in a historic meeting. It was historic, said the Hopi newspaper, *Qua' Töqti* (The Eagle's Cry), because it was the first time the traditionals had recognized the authority of the Hopi Tribal Council to arbitrate matters in dispute between two villages. Early in August the village of Shungopavi had formally and in writing complained to the Council about the HUD housing. They had hired a lawyer, one from the Native American Rights Fund, an Indian but not a Hopi. Under the by-laws of the Constitution, the Council had to hold hearings within eight days, and the proponents of the housing project in Shipaulovi quickly hired their own lawyer to represent them at the hearings, a Hopi lawyer. Alonzo told me it was not, in fact, a complaint by the whole village of Shungopavi. It was instead a complaint on the part of some members of Shungopavi's Bear Strap clan, although they had represented it as a village-wide complaint. "The kikmongwi didn't even attend the hearings." *Qua' Töqti* reported that the plaintiffs claimed they were justified in speaking for the kikmongwi. There was disagreement about the exact boundaries of the land in question. Calling it sacred, the plaintiffs were nevertheless unable to point out on a map exactly where it was when under cross-examination. The witness explained that the Bear Strap clan in Shungopavi had won title to the land long ago in a fight between a Bear clan member and a Bear Strap clan member.

On the second day of the hearings, the council and all the witnesses adjourned and went out to the desert to settle exactly what piece of land each side was talking about. *Qua' Töqti* reported that when both sides managed to agree on the exact locale of a couple of boundary markers, it rained—a good omen.

After the hearing resumed, a man from Shungopavi

—a member of the Bluebird clan whose uncle had been a Bear Strap—testified in behalf of Shipaulovi and the housing project. He was, Alonzo said, a man "who knew things." He said that the plaintiffs had the story wrong about the fight over the land long ago. The true story, his uncle had told him, was that the two men from the two clans coveted the land and finally they decided to have a duel over it. They stood back to back on the land while clan members looked on, walked four paces turned and shot arrows at each other. *Both* were struck dead. The land was now sullied by their blood soaking into it. So the people buried the two antagonists on the land with a sharp rock between them, and it was declared that neither of the two clans could ever again use that land, that if anyone from the Bear clan or the Bear Strap clan tried to claim the land, they would be beheaded by a sharp rock. ("Not beheaded in real life, of course," said Alonzo, "but that is the meaning of it.")

Thus the meeting ended, with the two lawyers directed to deliver summaries to the Council.

"I know that land is Shipaulovi land," said Alonzo. "Our uncles told us that it was there for us to live on when we became too many for the village. It has always been the place where we would go, where we would expand. All these ceremonies I take part in, all of our prayers. . . . I do this partly to keep the promise of our uncles, to make sure we deserve what they have left us. We have always planned on it.

"The traditionals, they want to delay it. They delayed the housing in 1971, and the money went to Polacca, down the road on First Mesa. Then we started again. We planned for 21 houses but the delay has now been so long that we can only build 13 or 14 houses because of inflation.

"I don't really know what they want, the traditionals. They are stirred up by outsiders—bahanas, Christians. That is why they do this." Alonzo, tired from the meetings, tired from the nearly endless round of ceremonies, tired from work at the school, tired from tending his fields and hauling water and bottles of propane, was a bitter man in August, but even so he would not ascribe evil motives to his opponents: They were stirred up, misled, by outsiders.

A few days later, we sat on Alonzo's back porch and watched the full moon rise over a distant mesa, making its way up the sky past a fish-shaped gray cloud. Alonzo was about to go off to Shungopavi for the final, all-night practice session for a Flute Dance. Alonzo's father had always participated in the Flute Dance and therefore so does Alonzo now that his father is gone. One of the participants in the ceremony was the primary plaintiff in the housing dispute. I asked him if there would be any awkwardness in staying up all night with so bitter an opponent.

"Oh no," Alonzo said, surprised by the implication of my question. "The ceremony is too important. We stay up and sing the sacred songs all night to purify ourselves so that our dancing and our prayers can do good for everyone." At dawn, after the all-night session, I drove Alonzo home. "How did it go?" I asked.

"The night went *so* fast," he said. "Before I knew it, it was five o'clock. We didn't have time to get through all the sacred songs. Some of those old people," he went on with admiration, "some of those old men know a whole lot of songs."

By this magazine's press time (a curious concept by Hopi standards; they have no words for days of the week but use English words instead), the matter had not been resolved. But it would be eventually and, whatever the outcome, one could be certain that it would not be the end of intratribal conflict or the last of the traditional versus progressive schism. It would not signal world peace or the achievement of love among all mankind. The actual outcome of this quarrel, indeed, may be quite insignificant.

But I am convinced—and traditional and progressive Hopi *all* know—that the manner, the spirit, in which a Hopi dispute is resolved, however insignificant it may seem, can somehow rub off on all of us.

And so the Hopi—fractious and wary but somehow knit together by history and clan and kinship and ceremonies no bahana will ever understand, have begun to think of other important matters. This month the eight-day Wuwuch'im ceremony started the annual ceremonial cycle all over again—with more prayers for rain, for next year's corn and for all mankind.

The rain-conscious Hopi believe that it is bad luck to point one's finger at a rainbow.

"I'm talking about jobs.

I'm talking about food on the table and goods in the store.

I'm talking about a dynamic economy that'll bring a new prosperity to this land."

These excerpts were taken from a talk by Lewis W. Foy, Chairman, Bethlehem Steel, at the Downtown Rotary Club, Washington, D.C., July 23, 1975. If you would like a copy of his entire talk *(A Progressive Program for "A Backward Nation")*, fill in and mail the coupon at right.

"I'd like to set the stage by telling you about 'a backward nation.'

I'm talking about a nation that's been 'backward' in terms of economic growth. Over a long period of years that particular nation had an average economic growth rate of only four percent a year—less than half the growth rate in Japan, and seventeenth among twenty leading industrial nations.

Seventeen out of twenty in economic growth? I say that's 'backward.'

I'm talking about a nation with lagging capital investment . . . lagging economic growth . . . lagging plant modernization . . . and lagging productivity gains . . . and I say that's a pretty fair description of a 'backward nation'—a nation that's falling behind.

Well, I guess you know what country I'm talking about. It's our country, the U.S.A.

Of course we're still an economic powerhouse. Of course we still have a sizeable lead over most other countries in a lot of respects, but we're losing our lead, and *fast*. Relative to the other major industrial nations, we're moving *backward*.

Why? Because too small a share of the nation's output is being allocated to investment. We simply aren't plowing enough of our resources back into productive enterprise, into the engines of growth and progress.

Where will new jobs come from?

About a million-and-a-half people will be entering the private labor force every year between now and 1980, and we want to make sure there are jobs for them, and I mean good jobs. But the average investment to create just a single new job opportunity is rising all the time. It's about $25,000 now, and it'll be close to $35,000 by 1980.

You might think about that for a moment: $52½ billion in the year 1980, just to create enough new job opportunities for the people coming into the labor force that year.

We won't get the economy back into gear unless and until the private sector can generate the capital funds needed for modernization and growth. In the case of my own industry, that's something in the order of $5 billion a year.

Corporate profits can't generate that kind of money, not the way things have been going.

The equity route is at a dead end these days, and there are limitations to further borrowings. Even if corporate debt weren't at record heights, there's the crowding-out effect of massive borrowing to cover oversized Federal deficits.

Where's that private investment capital coming from? How in the world is our 'backward' nation going to get moving forward again?

In my opinion there's no way to do it without an enlightened and coherent Federal income tax program.

A progressive program

I want to urge just five tax-related measures that are needed by companies like mine, and industries like the steel industry, and manufacturing and mining industries in general. To my way of thinking, these five measures are rock-bottom requirements.

First, I urge Congress to enact a realistic, effective capital recovery system.

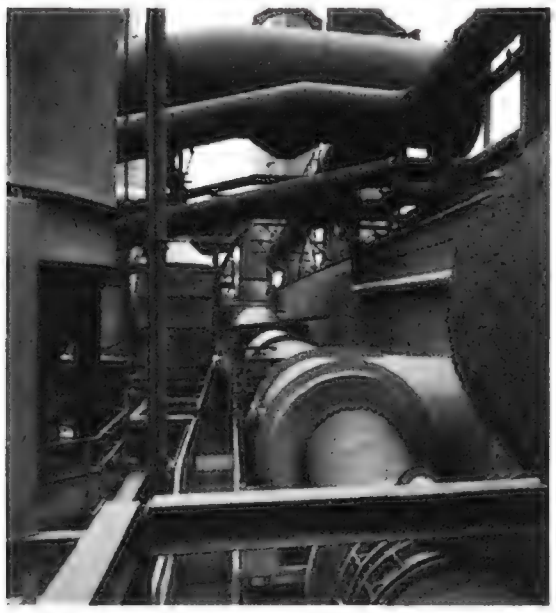
The guts of this system has to be *full* and *fast* recovery of expenditures for plant and equipment. Under the present depreciation system, we don't recover our investment

fast enough to plow it back into more capital spending when, as today, funds for capital spending are in short supply and badly needed.

And cost inflation makes matters a lot worse. Our original cost basis gets more ridiculous every year that replacement costs spiral upward. The longer the period for depreciation, the less we recover of the *real* costs of replacing our old equipment with equivalent modern equipment.

Second, what I've said about capital recovery goes *double* for the capital we're putting into pollution-abatement facilities.

Those facilities rarely produce a cent of income. In fact, they incur heavy operating costs year after year. In such cases the usual rationale for depreciation—recovering the expenditures out of earnings—makes no sense at all. *There aren't any earnings!*



In the past 5 years alone, Bethlehem has spent about $130 million for environmental protection and pollution control equipment. We expect to spend more than $600 million for such equipment during the next 5 years.

So, I recommend—I *urge*—that outlays for pollution control may be written off *immediately*, in the year the costs are incurred, or over any period that the taxpayer elects.

My third recommendation is this: Let's stop playing games with the investment tax credit. The Tax Reduction Act of 1975 took a step in the right direction, but it's only a single step.

At last Congress acknowledged what we've known for a long time, that the tax credit pays off in more investment. So far so good. Raising it from seven to ten percent was a sensible move, but limiting the increase to two years wasn't.

The business community needs *certainty* in order to plan ahead, and we need more than two years for long-range financial planning.

Let's boost the tax credit to *12 percent*. And let's make it *permanent*.

That would be another powerful shot-in-the-arm for economic growth and job formation, and it would lay the basis for increased future tax revenues.

Fourth, let's do something about double taxation of corporate profits. I mean taxing income when earned by the corporation and again when it's received by shareholders in the form of dividends.

Most other industrial nations have systems that provide relief from double taxation, and I think that's the way we ought to go. In the long run it'd help open up the possibility of more capital formation through sales of new issues of corporate stock.

My fifth and final recommendation has to do with natural resources—mining and energy production.

I'm not suggesting anything new. All I want to do is urge the continuation of the existing tax provisions—notably, percentage depletion. It's terribly important to the extractive industries. It's been a helpful feature of the tax code for more than forty years, ever since 1932.

Today, when the national well-being requires the greatest possible assurance of ample mineral raw materials and energy resources, we've got to encourage exploration, development, and production. This is expensive. It costs like sin. And it's just about the riskiest business going.

Bethlehem is a major participant in a joint venture for taconite development in Minnesota. The final tab is going to be about $300 million, and that's a lot of capital right there.

We've got to move forward

The immediate and long-lasting payoff from these tax-related measures will be nothing less than solid economic growth. And I'm not talking about benefits that, as some people say, would just 'trickle down' to all Americans.

I'm talking about jobs; I'm talking about food on the table and goods in the stores; I'm talking about a dynamic economy that'll build our strength in world markets and bring a new prosperity to this land and all its people.

This is worth fighting for, and I hope you'll join me in letting Congress know where we stand!"

Public Affairs Department, Room 476S
Bethlehem Steel Corporation
Bethlehem, PA 18016

YES, send me a copy of Mr. Foy's talk, *A Progressive Program For "A Backward Nation."* (Reprint includes documentation that the U.S. is "backward" in terms of economic growth.)

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By John Coyne

Keeping old crafts alive and well

At Penland School in the Carolina hills, master artisans teach a legion of learners weaving, smithing, even glassblowing

Bill Brown "loosened up the place" when he became Penland's second director 13 years ago. Here, still staying loose, he square dances with students.

High in the western mountains of North Carolina, at the end of a valley of pine trees and open fields, flush against a hill called Arthur's Knob and in view of the long blue ridge of the Black Mountain Range, is a remarkable school and community of craftsmen, called Penland. "It began by chance," says Miss Lucy Morgan, founder of the school, "and has survived on luck." Today, when millions of people have taken up handcrafts as an antidote to the mass production of nearly everything in life, professional craftsmen consider Penland one of the best craft schools in America.

Miss Morgan, who had been the director of the Episcopal Appalachian School in the village of Penland, wanted to preserve the disappearing traditional crafts of handweaving, spinning and vegetable dyeing. "There were two things I had hoped to do in the mountains," she recalls. "I wanted to bring about a revival of handweaving, which had become an all but dead art in the United States. And I wanted to provide our neighbor mothers with a means of adding to their meager incomes."

"Miss Lucy," as she is called at Penland, had studied handweaving herself in 1922 at Berea College in Kentucky, and as a young woman had brought back several modern looms for the women of the mountains. A determined person, she traveled the nearby hills on foot and by horseback and taught women, in their homes, the art of handweaving. She also bought their products and sold them at North Carolina resorts.

"We were just getting roads in the mountains and the Episcopal bishop bought me a little Model T roadster and, with Miss Amy Burt from the school, I'd travel the dusty roads. We'd go to a resort like Linville, and walk the streets until we found the best-looking hotel. Then we'd ask permission to sell our wares in the lobby. Miss Burt would stand in front of the booth, telling the story of our Penland efforts and selling goods, while I was at the loom, weaving. Now that I know the world a little better, I marvel that we were never turned away. The hotels always let us sell, and sometimes they even gave us a free lunch."

First, just an Appalachian log cabin

The success of this cottage instruction continued, and a log cabin was built on the ground of the Appalachian School. The cabin served as the first "school" and social center for the women of the community, and from that small beginning has grown a school with 40 buildings and 360 acres of land.

In 1928, Edward F. Worst of Chicago, who at the time had written the only book then available in the

John Coyne, author of several books on education and crafts, lives in Washington, D.C.

country on handweaving, *Foot-Power Hand-Weaving,* heard about the work of Miss Lucy and visited her. He was to return and teach at Penland every summer until his death in 1949.

By chance, Worst's visit to Penland was described in the magazine *The Handicrafter,* and as a result Miss Lucy received her first applications to attend school. She had not thought of having outsiders attend classes, but when Worst agreed to teach anyone who came, Miss Lucy accepted seven students. They were charged a dollar a day for room, board and tuition, and it was their arrival in August 1929 that Miss Lucy considers the actual beginning of Penland School of Crafts.

A younger generation takes over

Penland began to attract students not only from North Carolina, but also from other states and countries. Eventually, students from all the states and more than 60 foreign countries came to learn traditional mountain crafts. During the 33 years of Miss Lucy's directorship, Penland was a school that preserved these crafts while teaching them as leisure activities.

By 1962, Miss Lucy was in her early seventies and ready to retire. She and the board of trustees selected Bill Brown to be Penland's second director. Brown was particularly well qualified. He had bachelor's and master's degrees in design from Cranbrook Academy of Art and had taught design at the University of Delaware, the State University of New York at Oswego, and the Worcester Craft Center and Art Museum School. More important in terms of Penland, he had taught and been assistant director of Haystack Mountain School of Crafts in Deer Isle, Maine.

It is possible that Penland might have closed its doors at that crucial time in 1962 when Miss Lucy retired. Her generation, as she said, had "grown old" with her. Enrollments were down, and the school was financially insecure (not that it has ever been notably solvent). Bill Brown was able to "save" the school by moving it in a new direction.

He turned Penland from being primarily a school that taught traditional crafts toward being a school interested in advancing the professional skills of students and furthering the development of craft techniques and innovations. He dropped from the curriculum such crafts as making cornhusk dolls and basketweaving, and concentrated the school's resources on weaving, pottery, and silver- and metalsmithing. He added woodworking and, in 1964, glassblowing. Penland was one of the first schools in the country to teach this craft. He also introduced a resident program, where craftsmen had studio space and time to develop their skills and the marketability of their work.

"I began," explained Bill Brown, "by loosening up

"Miss Lucy" Morgan, Penland's retired founder, back to celebrate her 86th birthday, sits by a "show and tell" display of her enamel work.

Photographs by Evon Streetman

the place. Pretty soon we had a shift in the students applying to Penland. We began to get more college-age students. Part of the reason for this was the new interest young people have in crafts. They've heard about Penland—often from their grandparents who had been students here; we've jumped a generation. Or they have heard about it from craft teachers at their universities who have taught here."

Bill Brown's ability to attract the best craft teachers in the country is another reason for Penland's prominence in the craft world. According to Paulus Berensohn, potter and author of *Finding One's Way With Clay*, they come because of Brown: "He's one of the few people anywhere who treats craftsmen as important. He cares about us. So we come teach for him."

Brown's easy rapport with faculty and students, his openness and availability, set the congenial tone and easy cadence of the school. At least twice a day, coffee cup and cigarette in hand, Bill tours the craft shops and talks to the students. He is over six feet tall, lanky, with some of the northwest North Carolina tawniness about him. When not in motion, he keeps his sunglasses pushed up on his forehead and unguards his eyes; they bulge, are watery gray, and shine as if polished. His hair is thick and starting to gray. He is relaxed, in an open shirt, old pants, old shoes.

Touring the school, he explained how things operate. "The structure and content of a course is left to the instructor. Teachers do their own thing. Besides the crafts instructors, we invite dancers, poets and actors to the school, not to teach but to be available to students for discussions and special lectures.

"We've had about 360 of the finest craft teachers in the world as faculty members during the last 13 years. We can't afford them, so we don't pay them. They come for traveling expenses, plus room and board. If we hadn't had the contribution of these teachers, we wouldn't have a Penland."

Nothing is scheduled at Penland but the meals, and they are kept on time to the minute. The rest of the day, everyone finds his or her pace. Students "disappear" into their craft and conversation becomes a waste of time. It is not unusual to find a room of 30 potters bent silently over their turning wheels, with the only sound the slap of hands against wet clay.

At meals, however, there's a full house of talk and laughter. The dining room, in a grand old stone-and-

In jewelry-making class, a student tries out the clasp on a carefully fashioned piece of work.

In the spacious "Lily Loom House," weaving students learn the ins and outs of foot-powered looms.

wood building with a glassed-in porch and with dormitory rooms on top, fills up with 100 students plus 30 faculty members and staff. The dining room has the atmosphere of a kibbutz, that closeness of shared lives. The food is plentiful and home-cooked: pancakes for breakfast, brown breads, jams and jellies, biscuits, ham and thick gravy, fresh pies and cakes. Jane Brown, Bill's wife, oversees the kitchen and plans the menus.

"One major problem of the school," says Brown, "is that we can't take everyone who applies. We have space for only 750 students in the six summer sessions and our two concentrations, which are the eight-week terms in the fall and spring. We mail out the applications for summer March 1, and within five weeks all classes are filled."

Penland's resident glassblower and instructor, Richard Q. Ritter, blows and twirls a molten globe.

In the United States today there is a revival of interest in crafts that has helped Penland, as it has helped other fine summer craft institutions such as Arrowmont in nearby Tennessee and Haystack in Maine. A recent study by Louis Harris, for the National Research Center of the Arts, showed that two out of every five Americans are "doing" some craft. The World Crafts Council reports that interest in crafts in the United States is increasing at about 20 percent a year.

Gold-plated bronze pin, shown slightly enlarged, is the work of visiting instructor Robert Ebendorf.

People who are asked why they took up a particular craft use sensual words to describe their fondness for the materials involved. Working with such basic elements as wood, clay and fibers lets a person get "in touch" again with fundamental materials. Toshiko Takaezu, internationally known artist who teaches at Princeton University and Penland, put it this way: "When working with clay, I take pleasure from the process as well as from the finished piece. Every once in a while I am in tune with the clay, and I hear music, and it's like poetry. Those are moments that make pottery truly beautiful for me."

Crafts people also get tremendous satisfaction from surrounding themselves with handmade items. A bit of graffiti on the bulletin board at Penland sums up the feeling: "If everything in our homes is made of plastic, then we might as well live in hotel rooms."

The therapeutic value of crafts is not the only reason people are so involved. For many, it's a way to make a living. In 1966 the first Northeast Crafts Fair, sponsored by the American Crafts Council, sold the work of 80 craftsmen for $80,000. The same fair in 1974 sold products of 580 craftsmen for $750,000.

Rose Slivka, editor-in-chief of *Craft Horizons,* has said, "The craftsman has demonstrated that there is an economic base. His production, limited to assure personal control of quality, will not earn him a million dollars, but simply a modest living for himself and his family."

Crafts also have been seen as a way of providing a source of money for low-income families. The Office of Economic Opportunity during the late 1960s and early 1970s supplied grants of an estimated $12 million for craft development in depressed areas. OEO sponsored such successful cooperatives as The Freedom Quilting Bee of Alabama, Mountain Artisans of West Virginia, and Crafts Unlimited of North Carolina.

But much of the assistance, according to a study in 1974 for the Appalachian Regional Commission, has not been advantageous to the craftsman and the crafts industry. "The market has been overcrowded with low-quality crafts. Many craft enterprises have failed because of an unrealistic assessment of the craft market and production. Crafts which grew out of the cultural needs of an earlier time have been revived for economic enterprises without the realization that many can never be commercial products."

Not only that, but craftsmen themselves are divided—the folk or traditional craftsman, the contemporary, university-trained craftsman, the artist craftsman, the designer craftsman, the artisan or craft worker, and the hobbyist all have trouble communicating with one another. Each thinks that his craft and approach to crafts is the only way; therefore, organizing the total industry into coherence is unlikely.

Yet with all its troubles and factionalism, the world of crafts continues to expand. People of all ages are "finding their way with clay." People are learning again to forge, blow glass, work in fabrics. They are becoming silversmiths, weavers and joiners.

In the clear afternoon sun, from the rustic veranda of the craft house at Penland, one can see almost forever into North Carolina's gentle Black Mountains.

And by gaining skills, they also are gaining better control of their lives—learning how to live well, and in a different way. For working in crafts evidently makes a person tone down his or her life, and helps reduce the complexities of living. Not that making a living from crafts is easily done. The number of full-time craftsmen is limited, and the majority of them earn a large part of their living by teaching.

The struggle to have craftsmen and their work accepted as artists and art has been carried on by many craft groups, especially the nonprofit American Crafts Council, which has 35,000 members and publishes the magazine *Craft Horizons*. It is also being carried on by the newly formed Society of North American Goldsmiths, which has fewer than 100 members and is attempting to establish standards of excellence within the metalsmithing craft.

At Penland, Bill Brown sees no distinction between the terms "art" and "crafts." Penland is open to anyone who applies and does not establish requirements. "We have had art students, grandmothers, doctors, lawyers, teachers—anyone who wants to learn a craft." Naturally, desire alone does not make an artist or craftsman out of just anyone. But the experience of working at the school can be its own reward.

In the fall, when the mountains of North Carolina turn in color, Miss Lucy Morgan comes back to Penland to celebrate her birthday. On her last visit she was 86, and a cake had been baked for presentation to her at the midday meal. Bill Brown rang the bell—as is his custom for daily announcements—and introduced Miss Lucy.

A few years ago when she was younger, Bill would have had the students gather at the Craft House later that evening and asked her to tell stories of what Penland was like when the school was new, but now he merely leads the singing of "Happy Birthday," and Miss Lucy says a few words of thanks to students who are now all strangers to her. It has been 13 years since she left the school, but she is not sorry about the changes Bill Brown has made and is proud of what he has accomplished for the school. "No one, I'm sure, even a doting grandmother, could be prouder of all his accomplishments!"

In 1958, Lucy Morgan wrote a book about her life and the history of the school, entitled *Gift from the Hills*. To the many thousands who have lived and worked and enriched their lives at Penland, that is surely what it is.

The wet and facile hands of Ron Propst, a pottery-making instructor, shape an obedient mass of whirling clay into a vase as rapt students see how it's done.

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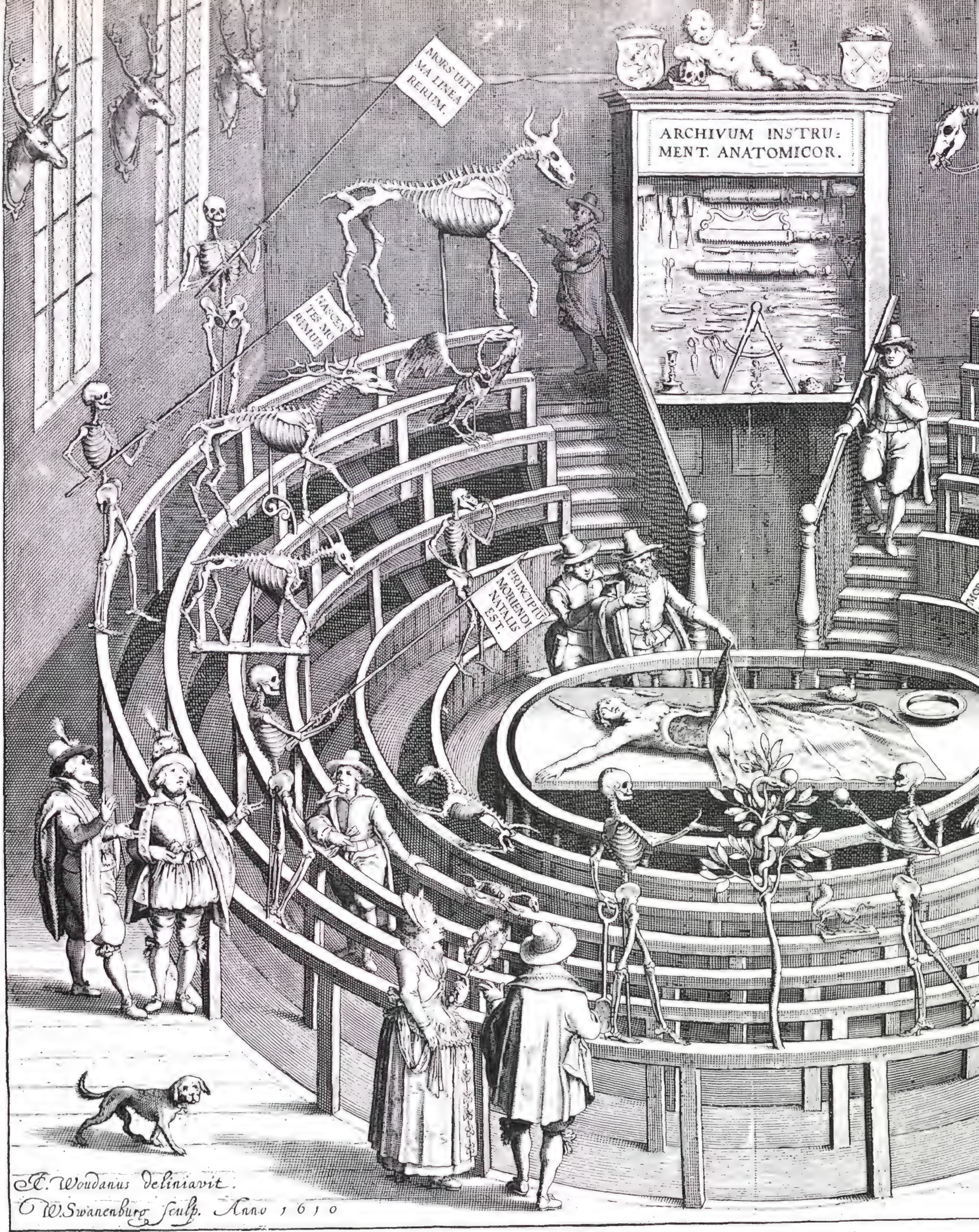
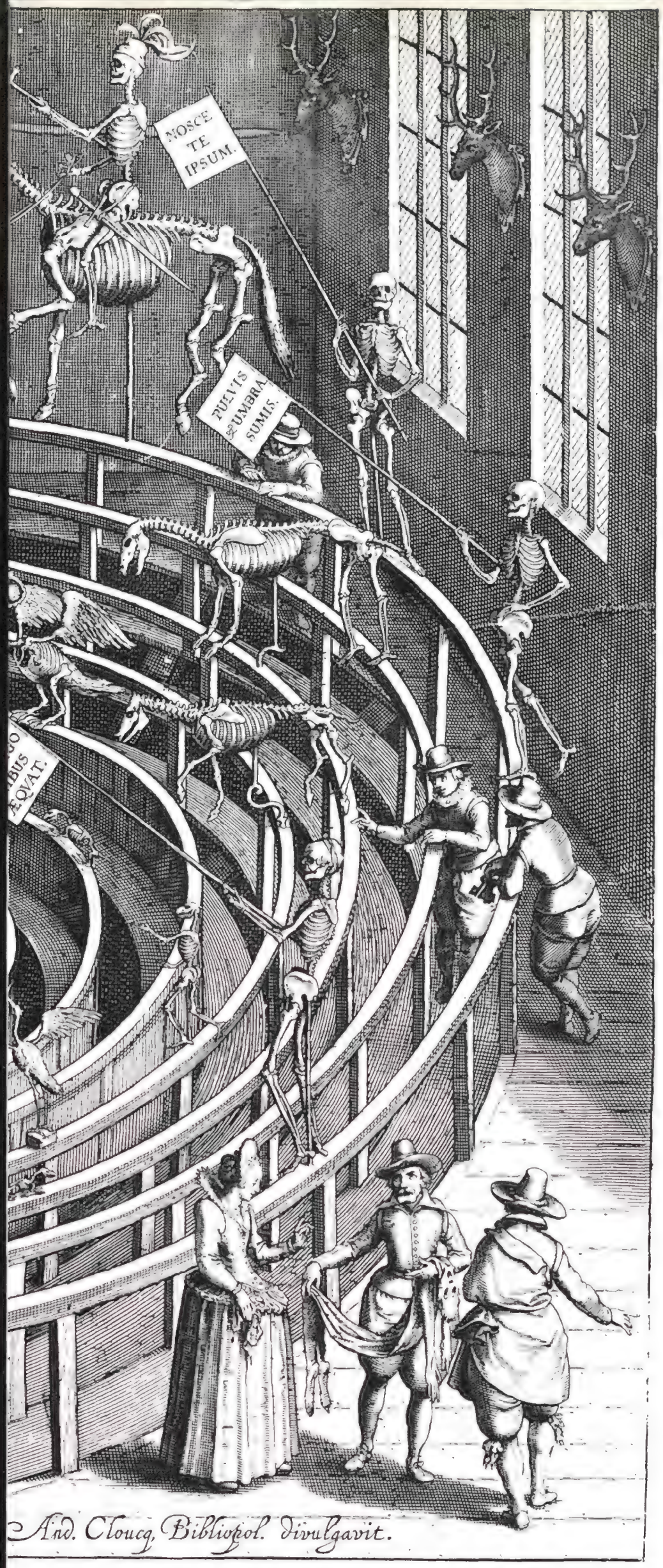


Today it would seem a chamber of horrors, but four centuries ago this amphitheater at Leiden University was the latest thing in medical science. On the rail in the foreground is a skeletal Garden of Eden tableau.



A human skin is displayed at the lower right. The banner legends are reminders: Life is transitory.

By Donald Gould

Those old cut-ups at Leiden U.

Holland's Rijksmuseum recreates a grisly 16th-century anatomy theater where burghers and students came to watch the action

Four centuries ago, at the tolling of a bell, prominent burghers of Leiden, Holland, often would leave whatever they were doing and hurry along to their recently opened university to share with students the excitement of watching a professor dissect the body of a newly executed criminal, or some felon who had died in jail. These ghoulish entertainments took place in a small, tiered circus built in the apse of a confiscated Catholic church.

Earlier this year, visitors to the Rijksmuseum in Amsterdam saw a full-scale reproduction of that old anatomy theater. It formed the rather spooky centerpiece of a quadricentennial exhibition mounted to celebrate the founding at Leiden in 1575 of the first, and still the foremost, university in the Netherlands.

For 75 years before that the Netherlands had been under Spanish rule, but the Inquisition and the presence of an army of occupation were among the tyrannies that finally made the Spanish overlordship intolerable. William of Orange launched a revolt in 1568. Early sallies failed, but within six years Dutch irregulars had captured and Calvinized the provinces of Holland and Zeeland, including the city of Leiden. It would be another 74 years before the Eighty Years' War formally and finally ended with Spanish recognition of the Netherlands' independence.

In 1574, before the Spanish were completely driven from the north, Leiden withstood a siege by the occupation forces. The fact that the university opened the very next year is a pointer to the spirit of the times.

Leiden's old anatomy theater

Down to Adam and Eve, apple and serpent, the 1975 reconstruction faithfully copied the old scene.

Much of the surrounding countryside had been flooded as a defense measure and was still under water. Daily life was disorganized. The people faced the immense task of making their newly liberated society prosperous and strong. And yet the difficult job of creating a new university out of nothing became a top priority the moment their freedom was gained.

The Dutch were determined to show that for them independence meant a great deal more than just the freedom to run their own civil and material affairs. It involved the opportunity and, indeed, the duty to promote by all means their native culture and ideals.

Jan van der Does (often called Janus Dousa), a statesman, landowner, poet and historian, who had commanded the citizens' resistance movement during the siege, was appointed the first curator of the university. His wide international reputation enabled him to attract scholars from all over Europe to form the faculty of an institution dedicated to the concept that humanism and scientific knowledge should be used as civilizing influences for the promotion of a better understanding within communities and between nations, so reducing the risk of future civil and religious wars.

But the burghers of Leiden were so eager to see their dream of a new center for European learning and culture become fact that the official opening ceremony in 1575 was held before either a faculty or a student body had been assembled. The story goes that various gentlemen of sufficiently grave and scholarly mien had to be hired to play the part of professors in order to lend the occasion substance.

The dissection of human bodies as a legitimate teaching and learning technique had become established at the University of Bologna 250 years earlier, and Leiden's anatomy theater was built in 1591, on the Roman pattern, in order to carry on the Italian tradition. The apse of the church seems a curious place for such an enterprise, but much of the new university was accommodated in religious buildings that had been abandoned when the Catholic clergy fled at the time of the Calvinist revolt—and much of the start-up money came from confiscated Catholic property. The original theater was torn down in 1820, but the church in which it stood remains as the university library.

The reconstruction at the Rijksmuseum was made on the basis of research in numerous surviving contemporary engravings, accounts and notebooks, and from measurements made in the still existing apse.

A revolving dissecting table, painted red and black, was mounted in the central circle. Copper rings were fixed around the table edge for the easy attachment of cloths used to cover a body so that only the part being dissected was exposed. The table was surrounded by six tiers of seats and an upper gallery that together could accommodate 200 onlookers. Above the table hung a huge candelabra of carved oak, and around the room were other lights mounted on decorated deer heads with antlers tipped with gold.

The anatomists had no means for preserving bodies, so their dissections took place only in wintertime, and even then had to be completed quickly unless there

was a hard frost to keep things cool. Before sessions the floor was covered with aromatic herbs. Members of the public were admitted for a fee, which tended to give the whole business something of the ambience of a waxworks. Places in the auditorium were occupied strictly on a hierarchical basis, with surgeons from the city and VIPs filling the front row and the students sitting behind, the freshmen occupying the highest and most distant tier of all.

The practice of admitting fee-paying witnesses to the shows was short-lived. Perhaps it only arose in the first place because of a fierce pride in the new university's achievements, and a desire to demonstrate them to the world at large. At any rate, some of the authorities must have gagged at the idea of making an exhibition of a serious academic pursuit and an exercise so clearly touching upon the dignity of Man, for by 1594 public demonstrations had been banned.

This prohibition did not mean that the ordinary citizen of Leiden was altogether denied the wonderment and instruction to be had out of a contemplation of his own physical nature and that of other living creatures. During the summer months, when dissections were impossible, the anatomy theater was used as a museum, and the spaces ordinarily occupied by the dissector, his corpse and his audience were filled by the skeletons of men and women and all manner of birds and beasts.

These exhibitions had a strong moralistic flavor, and were intended to make the visitor reflect upon the mutability of human life and to ponder upon Man's transitory state against a background of eternal truths. Two skeletons were mounted upon the central dissecting table to represent Adam and Eve. They were set either side of an apple tree within whose branches were entwined the coils of a stuffed serpent. This reminder of the fall of Man and his humble state was reinforced by banners held by other skeletons bearing admonitions in Latin designed to discourage vanity and false pride: "Remember you will die"; "Know thyself"; "Having been born we must die."

The Rijksmuseum reconstruction of 1975 included just such an exhibition, using skeletons of the same creatures as those depicted in an engraving dated 1610. The engraver was apparently no great scholar, for some of his Latin has an endearing schoolboy quality.

The Leiden gentry of the time suffered none of the squeamishness that afflicted later generations. The print shows a don demonstrating a complete human skin to the evident delight of an aristocratic lady visitor. And festooned across the back wall of the theater is the entire 28-foot length of a dried human intestine. The Rijksmuseum authorities decorated their 1975 reproduction with a similar frieze, but they balked at providing a whole human skin.

A case of surgical instruments was mounted above the entrance to the theater. Its contents reflected the nature of the craft at the time. The collection largely consisted of saws, chisels, hammers, clasp knives and scissors. These were the weapons of the military surgeon, used for amputations and the tidying up of wounds. The prolonged and fierce religious wars of the 16th and 17th centuries gave surgeons the experience and status in society they needed to advance their calling from an ill-regarded trade to a profession. New anatomical knowledge gained from dissections carried out in Leiden's *Theatrum Anatomicum* and its equivalents elsewhere was a major factor in improving the surgeon's skill as well as his status. With the country still at war, Leiden's first medical students were required to learn how to use at least the basic surgical tools before they graduated, and from the very first the anatomy lessons served that purpose.

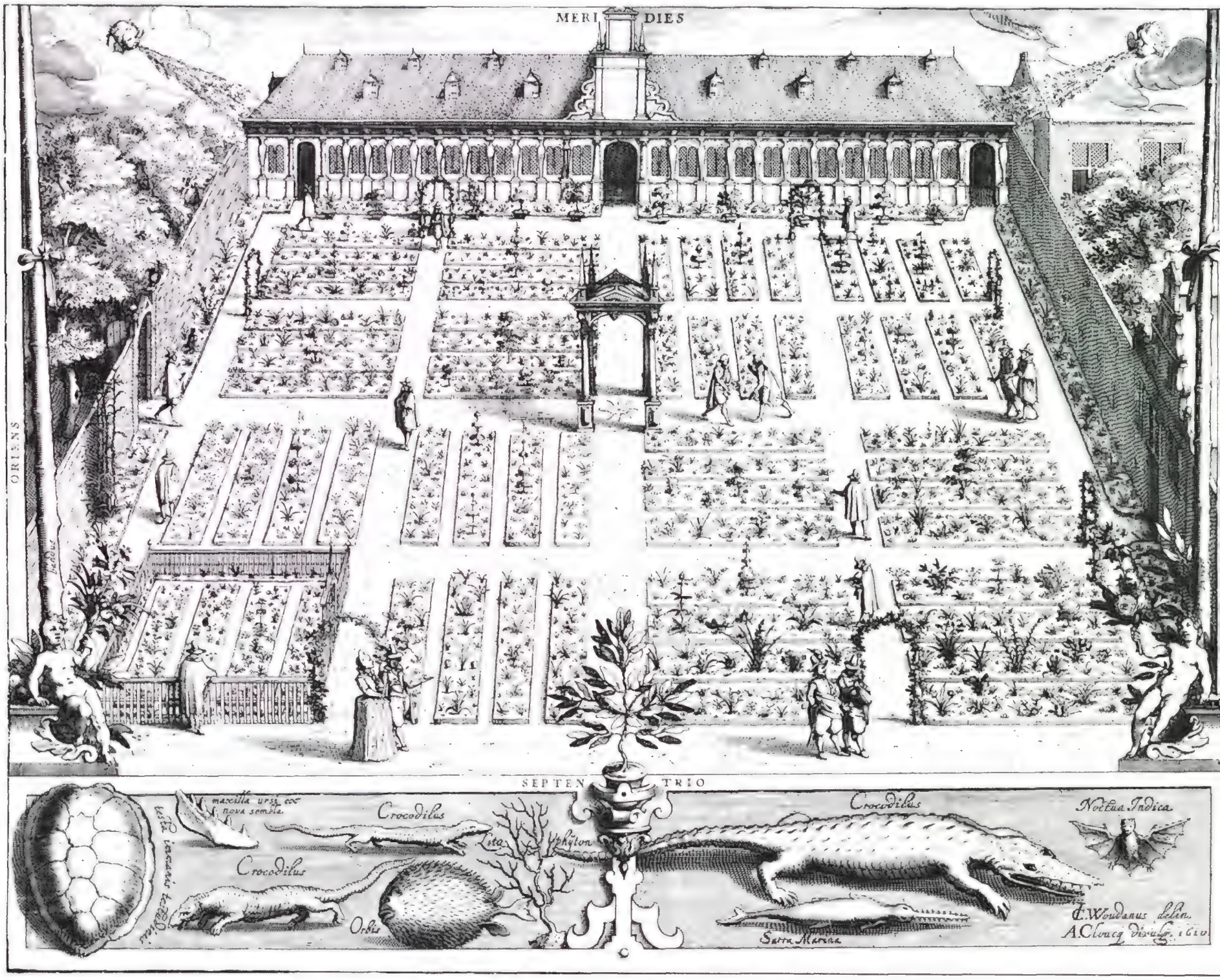
Not many solid relics of the beginnings of the University of Leiden medical school remain, but there are plenty of written records. So we know, for example,

Donald Gould's most recent SMITHSONIAN *article was about pilgrimages to the Shrine of Lourdes.*

about the course of training laid down for medical students in 1576. During their first year they studied the anatomies of a wide variety of animals, both dead and alive, and also learned to identify the many plants and minerals used in the elaborate medicinal compounds of the day. To aid these studies a large botanical garden was established. Then they were trained in the art of rhetoric and argument. Finally they learned how to diagnose and treat disease. For this purpose they accompanied their teachers to the homes of the sick, since there were no hospitals in the modern sense of the term—only a poorhouse. Later a convent was converted into a "pest and madhouse." Each professor was allocated 12 beds, and undertook the instruction of 12 students. At first the minimum age for obtaining a degree was 28 but before long this was lowered to 24—perhaps because doctors were urgently needed to serve with the armies in the continuing war.

Medicine had a long way to go when the University of Leiden and its medical school were founded, 53 years before William Harvey published his landmark treatise on the circulation of the blood. It still has a way to go, being full of enigmas. But an era began back there, 400 years ago, in places like the macabre anatomy theater. It would see the practice of medicine transformed from a mystical, semireligious set of rituals into an increasingly complex and precise technology and science.

The medical school's extensive botanical garden is portrayed—fancifully—in this engraving made, like the one opening this article, in 1610. The animals are more decorative than heribivorous.



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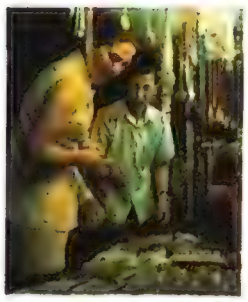

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Curtis Fort, every inch a rawhide-tough waddy, shows off one of his little bronzes, depicting himself in another age—when the range was free and the settlers were few and far between.

By John Neary

Cowpoke-sculptor rides the range

Top hand with a $40 hat, he jingles when he walks, partly from his spurs and partly from the coins his bronzes earn

When I met Curtis Fort, he was like many another young American—working for a large corporation and hoping to advance someday to an executive position. There, however, the resemblance between Curtis Fort and most of his contemporaries ended.

For one thing, Curtis commuted by merely stepping out the front door of his propane-heated frame house at the northern New Mexico headquarters of the mammoth Vermejo ranch, owned by the Pennzoil Company. He got into a pickup truck, drove 100 yards or so to the stable, saddled up Jesse James, or Dogie, and began another day as a working cowboy. There was another difference. Curtis is a successful sculptor.

Being a cowboy comes first. Curtis has been doing it for 20 years and still gets a thrill out of this job that he has never experienced from any other kind of work. You can read that feeling in his miniature bronzes.

Curtis is certain he prefers life in the Old West (capital "O," capital "W") to anything (rock music excepted) nowadays. Consequently, he tries to be just as "old-timey," as he calls it, as he can be.

He will use a propane-heated branding iron if the traffic demands it—lighting his smokes from it, too—but he still carries a little forged running iron in his chaps, and can heat it cherry-red over a tiny mesquite fire to brand a stray calf.

Because of its remoteness (headquarters is 40 miles in from the blacktop) and its altitude (from 5,900 feet to 12,580), Vermejo geographically seemed to me an auspicious place to work at being an anachronism: the West before power plants started belching coal smoke into that incredible sky, before superhighways, motels, drive-ins and mobile homes. It is a half-million acres of mountainscape laced by a hundred miles of trout streams, bejeweled with 60 lakes, running with elk, deer and other game. The air here is so clear that peaks 25 miles distant are crisply visible. This sort of country shouts of that other time in which Curtis Fort so fervently wishes he had lived. He is, head to toe, a walking Williamsburg of the Old West.

Head: no ordinary off-the-shelf hat does Curtis wear. He owns five, each a thing of his own making. He selects, as the raw material from which he will fashion a new hat, a $40 hat with a tall, cylindrical crown and a flat brim five inches wide. At home, Curtis sets a kettle of water on the stove; when the steam whistles, he sculpts a hat over the spout, shaping the 5X beaver felt into the kind of headgear a Charles Russell cowpoke wouldn't have blushed to wear. Strangers often approach Curtis with unabashed awe, seeking to buy his hat right off his head.

Toe: showpiece of the cobbler's art ($70 a pair), boots are rasped by neglect and abuse. Handsome black toes and fiery red tops are now a weather-beaten workworn gray all over with only a hint of rosy patina left, stitching busted, a hole in each sole, a panache as carelessly achieved as the hat's was consciously. A waitress in Raton once correctly identified a stranger as a buddy of Fort by "them high-topped, wild-lookin' boots, a sure-enough cowboy's."

Curtis' gaudy shirt, sleeves gauntleted by leather cuffs, is tucked into faded jeans held up by a bronc-riding trophy buckle won by his brother. Over his jeans could be (depending on the riding ahead) either a pair of short leather chaps called "chinks" or a longer, heavier pair of "shotgun" chaps. Curtis made both sets of leggings, outfitted them with old-fashioned concho ornaments. He jingles as he walks, too: "baby Chihuahua" spurs, with rowels that look as if they'd ribbon a horse's flanks in no time. Curtis says they don't. "I'd rather jingle 'em than jab with 'em."

Gaudy and old-timey as Curtis may appear, his gear enables him to be a nearly self-contained field unit in the business of turning cows into beef. With it, and a saddle, slicker, pigging string, rope and bedroll, there's nothing more he needs except to be able to find his way to the cookhouse.

Ranches through the Southwest, hit by drought, soaring costs and sagging prices, have taken a bad beating. At Vermejo, elk herds looked better and better. The management has always catered to well-heeled hunters and fishermen who can afford its high tabs. Yet

John Neary wrote an article about a Long Island arboretum for SMITHSONIAN *in August 1972.*

Sculptor rides herd on Old West

for Curtis the endless cycle went on, driving the cattle down in the fall from the pastures in the high-country where snow piles deeper than the hood of a pickup before winter ends, the long round of maintenance until spring, fixing fences and breaking ice in the windmill ponds. Then spring branding and the drive into the mountains again.

On a ranch, nobody sleeps late waiting for the market to turn for the better. Work begins at daybreak. As the sun comes into view, 93 million miles or so down the canyon, it silhouettes the cottonwoods in sharply etched black, paints the rock walls of the canyon pink-gold and turns the sky caldron red. At the long table in the cookhouse, ranchhands ignore the beauty of the dawn and concentrate on soaking up heat from the blasting propane stove before leaving for their chores. Cowboy boss and cattle boss linger over coffee to block out the day and talk about cow tracks someone spotted while hunting in the high country. It seems unlikely that any livestock is up there, but there is a chance, so Curtis and another hand will take two horses in a truck and scour the area.

Horses saddled and loaded, the little caravan moves out along the winding snow-packed dirt road that leads through this beautiful place. We pass a stage stop, long abandoned, its log roof caved in, its fallen door burned with the brands of countless ranches by the cowboys who have drifted through here. Curtis has had breakfast with his pretty wife, Nancy, but he has appropriated rations from the cookhouse. We share them: bacon and toast. And black coffee. Fantastic.

It is lovely here, and it must be fun to rope an unwary elk, as Curtis sometimes finds it necessary to do, strictly in the line of duty, and festoon its antlers with a bandanna. Maybe there is a bear that needs chasing. This kind of rambunctiousness just naturally carries on over into the rest of the work and raises quivers among his bosses. But they rated Curtis a top hand—and expressed hope he will gentle down some. Curtis says, "I try to have a good time. You only get one stab at it. I don't want to die in no car wreck."

The horses are lathered by the time they finish searching the broad canyon and side canyons, but no cattle are found. Back at headquarters, the men decide to replace their mounts' shoes. It is not much like the 20th century, standing there in the stable watching. Somehow the weathered gray boards of the tack room, the winy light filtering through the layered accretions of decades of dust down onto the burnished saddles and harnesses, the ancient cracked anvil broken no one can recall how, the tapping of the farrier's hammer, all conspire to evoke an aura of another age.

Curtis' horse, Jesse James, alternates between trying to pull the barn down and standing frozen in equine obstinacy. When he rears and tugs, Curtis, his mouth full of horseshoe nails, murmurs soothing noises. When Jessie James refuses to lift his big hoof, Curtis pats his leg. "Give me your hand," he says, lifting gently, "Give me your hand." Patience is wise with Jesse. "When he gets to turning the crank," Curtis says, "I respect him. That ground is frozen, and I don't want to bust it."

Besides the fun and glamour, there is real work involved in this job. "If I didn't know cowboys were supposed to be strong and brave," Curtis told me, describing what it is like to ride the wintertime canyons and ridges of the high country, "I'd have laid down and plumb cried. It was that cold." Hard work, long hours, poor wages and a future that has rarely been anything but uncertain—being a cowpoke seems a superb occupation to avoid.

"Neighboring" across the range

That was precisely the advice Curtis Fort got from his rancher father back in Tatum, New Mexico. Folks around Tatum couldn't afford to hire cowboys, so whole families turned out to help neighbors with roundups and branding and haying. When his family "neighbored," Curtis joined in too, working across 1,000 square miles of range, on some 30 different ranches. He remembers riding one winter day when "It must have been ten degrees and snow ablowin'. My dad says, 'I'll send you to school. You can be a schoolteacher. Them guys are in a warm building. They get three months off. . . . Look at me, I don't have a thing.' " Curtis could not agree; to him it seemed as though his father had everything a man could want.

Therefore, the night he received his high school diploma, Curtis dropped Nancy Brown, his steady girl, at her house and rushed straight home to pack his

Two cowhands brand one calf while Fort brings up another at the end of his taut rope.

bag. He was bound for Texas and there, he recalls now, "I seen what I liked. There was still big ranches; they was still runnin' Western: 300, 400 saddle horses and you didn't have to touch a windmill." Assigned three of those horses as his own, Curtis sneaked off to the corral to get to know them while everyone else, he thought, headed for the cookhouse. "I thought, Man, if one of them dents me! I *really* wanted to make a show for these guys, so I went down there to top them off. I stepped aboard this little blue and he started to unwind, and there on the fence were three of them guys! One of them came up later and said, 'Pretty good riding, lad.' They looked out for me."

At the same time, with no lessons, no courses, no conscious stimulus whatever beyond loneliness for the range and a certain homesickness, Curtis began sculpting little touchstones to the life he hungered for. He had been to visit a friend and noticed the friend working on tiny wax figures. He took the ball of wax his friend gave him home and made a cowboy and a boot. Not until he had made a hundred more did he feel he had one worth casting. "I'd sit up all night long, 14 or 15 hours, and finish that thing. I'd let it sit there awhile and a friend would come by and ask for it and I'd give it away. Then I'd have to go and swap it back and say, 'I'll make you a better one,' because I'd look at it and say to myself, 'I can do it better!' Once you get it in bronze, it's permanent. Anything I have in bronze, I *know* I can do a little better—that's why I hate to have anything cast: It's gone."

With Nancy (who had become Mrs. Fort), Curtis went to another ranch to work. He cowboyed, she cooked for the crew; together they made nearly $700 a month, with a house and groceries thrown in. "But," Curtis discovered, "we never had time to go spend it—so that got old after a while." As they pondered the problem, Nancy went back to finish getting her degree, in physical education, and not long after that, something exciting happened. A gallery *cum* curio shop in Raton, New Mexico, offered to present a show of Curtis' work. He and Nancy forthwith moved to the nearby Vermejo ranch, hired on as cowboy and cook—this time with a room set aside as a studio.

Out of it came painstakingly detailed cows with calves, wolves, bears, buffalo and bronc riders. Curtis Fort has sold nearly 70 bronzes since he started sculpting and he admits Vermejo's "frontage" afforded his work exposure to a big-spending audience of outdoors-loving sportsmen. "I could go in there and finish one in two nights, working from six to ten. If I was really hitting, that is, and knew exactly what I wanted to do."

Accustomed to laboring a month of long days to earn a cowhand's $450, Curtis feels a bit guilty about the money a tiny bronze cowboy can earn in the flick of a checkbook. "I'd like to say I don't charge much—which I don't—but I still feel I'm robbing somebody when they buy something. It's not *that* much art. It cost $200 to cast it; I'm $300 ahead. It ain't worth that much. People say 'What about your time?' but if I wasn't doing this, I'd be in there watching the idiot

Cowpunchers ride herd on cattle moving up to the high summer pastures of Vermejo Park,

box. People say, 'Why don't you do it for a living?' but then it wouldn't be a hobby."

Cattle country just somehow makes him want to "do art," he says, but it has primarily a historic function, as he sees it. "I want to be authentic. I don't claim to be the best on anatomy. Everything I make, I make out of my head to tell a story. Then, if somebody wants to buy a copy, fine. Charlie Russell left something to show what it was like in *his* day. If I leave *anything*, I'd like them to think that they did work cattle and rode bucking horses in the 1970s. What'd be neat," he added, thinking about the possibility of selling $100,000 worth of his work, "is to have that much money and go on a-cowboying."

Riding around the Vermejo one day, I asked Curtis if he had ever considered being anything other than a cowboy. He answered me without a flicker of hesitation. "No," he said. But a day or so later, as we came upon a breathtaking view of a frozen mountainside overlooking an ice-clad lake, Curtis admitted that just for ten years or so, he would like to have been Kit Carson, or maybe Jim Bridger. We agreed they must have seen themselves some sights, those old boys who made their way through hills like these.

"I get to reading how it used to be," Curtis said, "and I damn near cry. It'll take 'em a few years to figure out how to level the mountains. Until then, the best way to use this land is to turn the grass into beef.

"As long as that is, that's where me and Nancy and everybody else we care about'll be."

Pennzoil's half-million-acre spread of wild country in New Mexico, where Fort worked.

JOHN F KENNEDY

By Avon Neal
Photographs by Ann Parker

Molas: jungle view of 'civilization'

When these island Indians go ashore in Panama they note ads and posters and later use them as designs for their appliquéd blouses

It takes only a few minutes to fly across the steep, jungle-clad mountains between Panama City and the San Blas Islands, but historically the trip spans centuries—from crowded 20th-century streets to the home of Panama's Cuna Indians. Here you find the cultural phenomenon called the mola.

For the uninitiated, molas are those spectacular cutwork, appliquéd blouses worn by Cuna women and currently sold as folk art in boutiques and museum shops throughout Europe and North America, where they are usually framed and exhibited as wall hangings. They are also used for pillow covers and handbags, or pieced together to create exotic evening gowns. As an indigenous art form, molas are undoubtedly among the most diverse and exciting textiles being produced in the world today.

The rectangular panels which form the fronts and backs of molas display motifs that include flora and fauna found in the San Blas area, abstract geometric patterns, Bible tales, legends, current events, and imaginative renderings copied from magazine illustrations, trademarks, comic books and record album covers. In general, any visual discovery that strikes the artist's fancy is fair game.

If you are accepted by the Cunas and explain your

John F. Kennedy portrait is surmounted by Presidential emblem, rocking chair and PT Boat.

Cuna child of the San Blas Islands wears a mask while displaying a mola.

interest in molas, the blouses begin appearing from everywhere. The entire female population turns out, everybody from shy young girls to wizened, pipe-smoking old women, all wearing gold rings in their noses and urging you to buy. They keep up a lively banter in Cuna dialect as they display their brightly colored wares. When a selection is made they state a firm price and seldom haggle.

The mola as we know it now came into being only a little over a hundred years ago. Some people claim that when missionaries insisted that the nearly naked Cuna women wear Mother Hubbards, the Indians—accustomed to body painting—simply began decorating their clothing with similar motifs. This provides a charming explanation, but unfortunately there is little evidence to support it. However, the molas can be traced from a few early photographs and descriptions. Among the goods brought to the islands by early traders were scissors, needles, thread and cotton cloth.

A mola design can catch on and sweep through the islands in a single season and remain popular for several years. One such theme was the familiar RCA Victor trademark, "His Master's Voice," featuring Nipper the dog listening with cocked head to the trumpet-shaped horn. Although rarely found now, it was a perennial for many years. A more recent but equally intriguing theme has been some version of astronauts and the moon landing. Cunas delight in portraying this subject, although in discussion they will freely admit that they cannot quite comprehend or even quite believe in the actual event.

Baseball scene includes Marilyn Monroe.

Tarzan and Cheetah ride an elephant.

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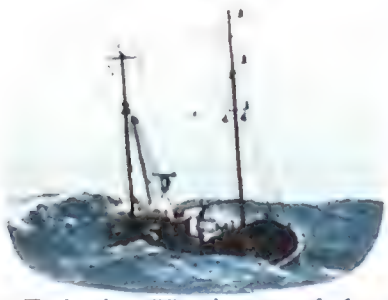

"This Britain: Heritage of the Sea"
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Gulf

It all began in Great Britain, where British Rail has evolved into an admirable model for the United States.

Text and illustrations by Jan Adkins

In proper context passenger rail can be workable

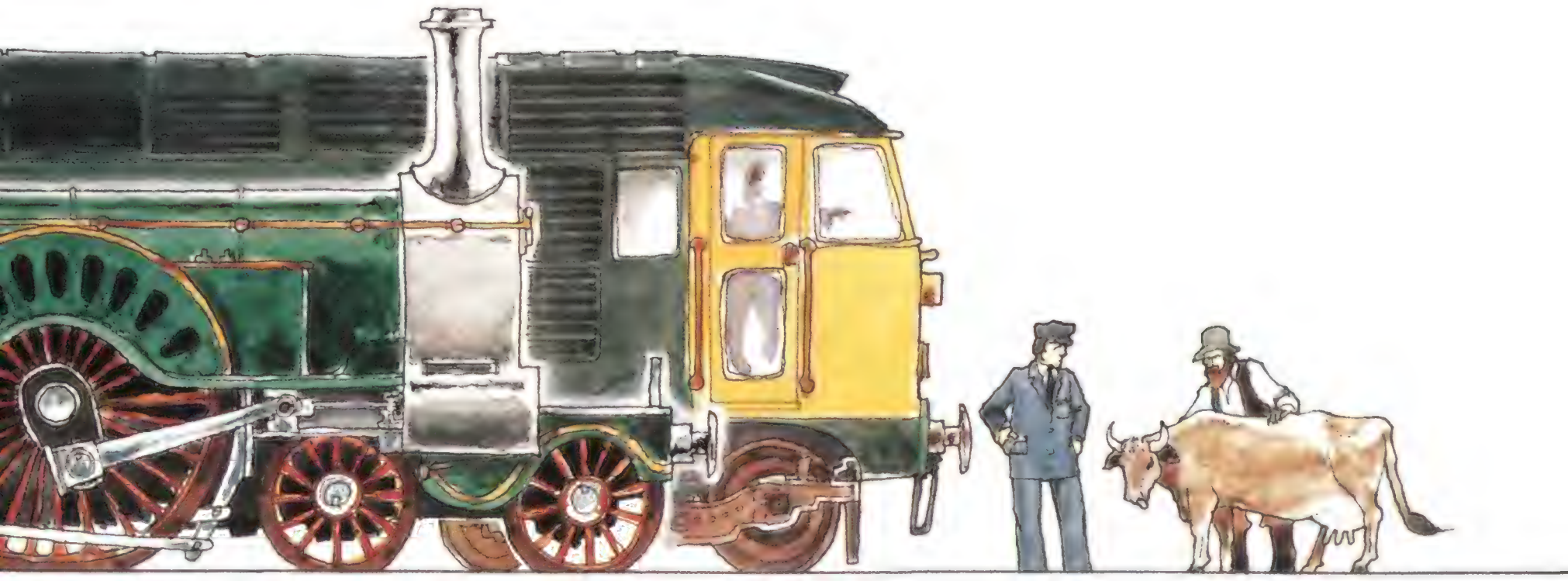
A trip by British Rail teaches lesson that, with determination and a subsidy, a train is an efficient carrier of people

The Benwood-McMechen marshaling yards in 1949 were full of rolling stock, vast and crowded with gondolas, flats, tank cars, boxcars, coaches, pullmans, jaunty cabooses and a thousand grim, filthy hoppers caked with the dust of West Virginia coal. To a five-year old, carried or clinging to his father's rough hand, it seemed a foolish venture to walk along the tracks, too close to the metal giants, even behind his knowing grandfather whom the cars would never bite. Carried, not without protest, onto the turntable, I watched my grandfather throw a switch and the roundhouse began to swing past. All protest disappeared; the great disc turned, or the yards turned around it—the iron snouts of steam locomotives grinning with cowcatchers, short and stocky switching engines, the blunt foreheads of new diesels with their plain flanks.

Eighteen years later I waited at the Columbus, Ohio, depot for a train from Cleveland, three hours away by road. The train was three hours late. In most large American cities the depot is a focus, an architectural landmark. All but deserted now, the Columbus station's roof was leaking, staining the walls; the clocks no longer bothered with the time, the shops of the arcade were boarded shut. In the middle of the afternoon a train crew walked through and we were told that they were from the Cleveland train, that the union-limited time they could man the train had run out. They had stopped the train just outside Columbus, called for a taxi and ridden into the depot. Another crew was taxied out. Not long now. Three people were waiting in the depot; we were all at the windows over the track looking for the iron horse, the linker of cities, handler of freight, the B&O's Cleveland-Columbus express. We hardly noticed its coming: a single self-propelled car rolling into the yards like a runaway from its Lionel locomotive.

That was 1967. Passenger rail was critically ill. In 1975, with Amtrak and after the first palpable tremors of energy starvation, passenger rail is still in trouble.

But now is a time for reappraisal. Most of us now know that Detroit cannot produce the patents (long suppressed, goes the legend) on engines that fill up



Viewed from front to back are the Wren, the Stirling Single, the ABR engine—and an obstruction.

with a pint of high test and a pound of kitchen scraps. We are looking to new sources—the tides, the sun, the atom—and to old ideas discarded unwisely: the smaller car, the willing pedestrian, the passenger railway.

Reassessing the passenger railroad in terms of energy use is difficult in the United States because of a quarter-century of deliberate service reduction by the railroads themselves, a dismantling of passenger rail based on corporate economic terms. Thousands of miles of unused track rust across America, just as the great decaying body of Penn Central sprawls over the Northeast.

There is the possibility that rail travel deserved its death. We lose sight of what a big spread America is: A business person or a time-bound vacationer will probably not opt for an 18-hour train trip from New York to Chicago over a two-hour jet ride. Additionally, fares for long rail travel are necessarily high because of the man-hours involved in tending train and passenger, preparing and serving food, changing crews. A simple overnight trip from Washington, D.C., to Atlanta for 250 people requires 31 on-board and 24 supplementary employees. Corresponding air service carries 135 people with an air crew of seven, a ground crew of about 14, and could make the trip several times a day.

Very well then, can we let the railroads expire and get on with it? No; transport is a complexity that requires the nicest judgment. Each of the major modes of travel and transport is efficient within a range of use and distance. Efficient energy conservation will be a result of exploiting each travel mode for its particular virtues: How does it *want* to be used?

The airplane is a long-distance passenger service. It requires large amounts of fuel per passenger mile, but a balance must be made giving time some weight. In fuel-consumption terms, the oxcart looks very interesting, but for crossing time zones, the airplane excels. Even with high-speed trains (150 mph maximum, 65 mph average), Chicago to San Francisco would be a day-long trip. The airplane is definitely a poor freight carrier for anything but small rush orders, and it is exceptionally inefficient on short runs.

The automobile is, by current standards, more indispensable than efficient as a short-distance door-to-door carrier in an exurban or even suburban setting. Our lives are set up in a private-car matrix; the auto is the key to our transportation system. Food gathering, commuting, employment, education—the automobile will be a regrettable necessity until public transport systems almost duplicate the matrix.

The truck is a freight handler, a door-to-door delivery transport. It is versatile and convenient, but it has definite limitations. It is best at short and medium hauls, at light to medium loads, and at mixed-load deliveries. It loses energy efficiency in the long haul.

The bus is a sector-to-sector delivery service unexcelled at carrying people short distances. Its routes are fairly flexible. Its limitation is primarily distance. Over short runs the confined passenger space is ac-

Jan Adkins has illustrated several articles in past issues of SMITHSONIAN. *He lives near Cape Cod, where he writes books and travels mostly by sailboat.*

ceptable, but a long-distance ride on a bus requires both an astronaut's resistance to claustrophobia and an unshakable love of humanity.

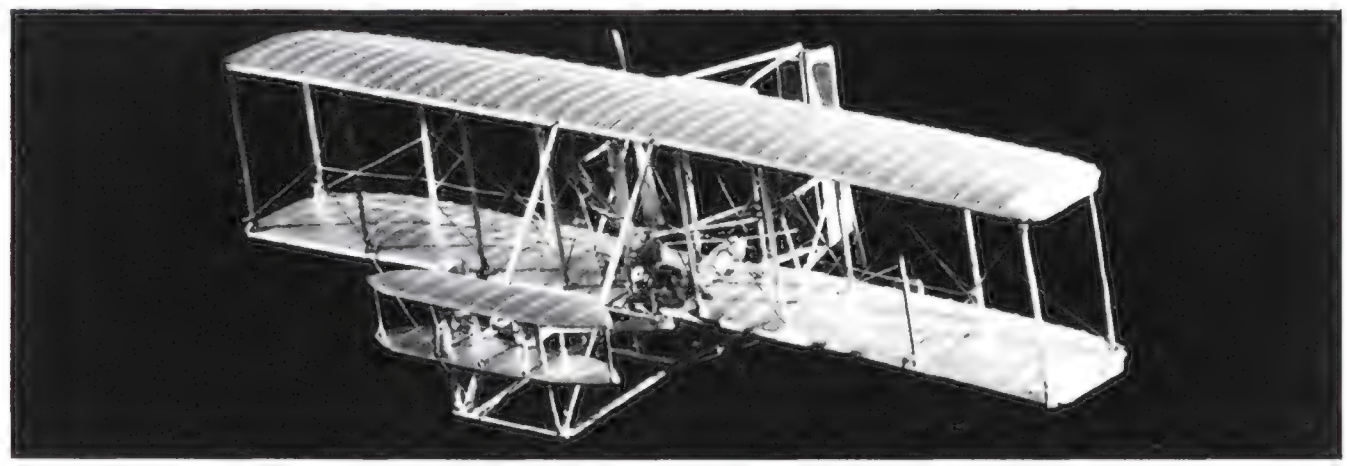
The railroad: What are its virtues and limitations? Its routes, the railroad rights-of-way, are inflexible, but no other form of transport is so efficient over so broad a range. It can operate well at speeds of 5 mph to 100 mph; its specialized cars carry sleeping people or nitric acid or poultry or steel ingots; one train can carry passengers, a post office sorting room, intercity packages, a bar and a restaurant. In the form of subways and rapid-transit systems, the train is useful in moving a high passenger volume quickly and without additional street congestion. The train's specialty, however, is intercity transport, short to medium distance area-to-area runs.

A train is heavy, extremely heavy, but once moving on a long run its weight and momentum serve it well. A train half a mile long rests on 33 linear feet of bearing surface; its steel wheels rolling on steel rails cause far less friction than rubber tires on asphalt. The locomotive bores a hole in the air and its cars follow it through, so that a train of 20 passenger cars has a fraction of the wind resistance caused by the number of automobiles required to carry the same population. In terms of land use, the railroad is a bargain: A single track right-of-way will handle more service than a ten-lane superhighway. The railroad is a better energy buy than any freight transport but the barge and pipeline, better than any passenger mode but the bus.

Then why is the railroad in such chronic trouble? One answer is that the railroads have had to maintain every mile of their own tracks. On the other hand, if the highways in the United States had to account for themselves, they would be bankrupt. We all pay for them, subsidize them, but we expect railroads to go it alone. Until rail thoroughfares are considered public thoroughfares, however, as highways are, the railroads will always remain at a disadvantage.

Another response is that by and large the railroad is alive and well, doing just fine—in the freight yards. In 1974 American railroads carried more freight than ever before: 856 billion ton-miles (more than the total of all European rail freight excluding Russian), and increased its share of the freight market in the United States to 39 percent. Its brother, passenger service, has been steadily losing money since we became a nation of automobile passengers.

Can passenger service be efficient? It is at its best in intercity transport through a high population density, over short to medium distances of 50 to 500 miles. The



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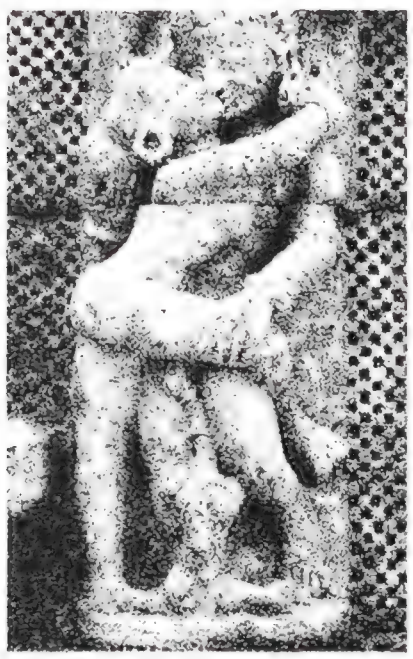
plains of Iowa can't fill passenger trains, runs between villages in Tennessee are impractical, but the urban strip between Boston and Washington—the Northeast Corridor—is ideal.

Some 4,000 miles across the North Atlantic is an analogy, a rail system of about the same size in length of runs, passing through somewhat higher density but serving about the same population in land space increasingly precious. British Rail gives the United Kingdom the service that we should have in the Northeast.

Britain is a very big island, and a very small nation. Every acre of land is cultivated, grazed, built upon or carefully kept free, for in a small nation with a bulging population land is too precious to waste. More than an analogy, Britain's crowded condition today is a projection of conditions that will face the United States in a few years. Cemeteries, for example, are full, cremation is up to 65 percent and small burial yards in London have begun to move headstones to the edges, opening up the middle as grass.

The railroad began in Britain. The steam engine, the Industrial Revolution and the railroad were born in a brief flurry of invention and activity that changed not only Britain, but the world. The lines laid, the fortunes gambled, the rivalries, the engineering marvels and the creative drive of men like Isambard Brunel made a time that Britons think of in the proud, admiring way we consider

IN INDIA c.400 B.C., THEY FOUND A BETTER WAY TO CURE A FEVER.



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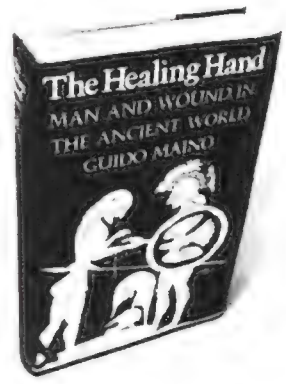

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THE PAST IS THIS YEAR'S BEST PRESENT.

our American West. The railroads grew as rival companies and served Britain in almost every town as the only fast transport, the primary travel mode across the country or to market on Saturday.

After World War II the British government found itself supporting an overgrown rail system duplicated by bus lines and highways, draining the Exchequer for its yearly increasing deficits. The little lines between Yatton and Clevedon, Halwill and Torrington, were running empty, still on schedule, and still consuming pounds sterling at an inflationary rate. Britain has never been short of headsmen, and the headsman was produced: Lord Beeching wielded the reorganization pruner referred to now as Beeching's Ax. Men in the British Rail offices thank God that Beeching came along, "and thank God that someone stopped him when they did."

He trimmed the branch lines and left a route system that seems anything but sleek (from nearly 18,000 route miles down to about 11,000). The railway still serves thousands of stations all over Britain and Ireland. The new British Rail is faster, more comfortable, more efficient, and still eager to carry passengers. There are fewer local runs, but as energy supplies gurgle toward the bottom of the barrel, a few towns are willing to subsidize the branch lines to their communities, believing that the benefits of the railway —in public service or economic stimulation—are worth more than the operating deficit they have to make up.

There are deficits. British Rail loses money, in some areas more than in others, but strong considerations convince the British Railway Board and all three major political parties that rail services (accounting for nine percent of noncommuter intercity passenger travel—as opposed to less than one percent for the United States) are worthwhile.

The rail right-of-way already exists, and has since the turn of the century. It is like a barbed-wire fence nailed into the side of a tree; its scar has disappeared as the tree has grown around it. The rails remain, viable and serving. The cities grew around the rails, the towns adjusted their growth beside them; they seem natural, now.

The unobtrusiveness of rail is the reason that the North Yorkshire Moors National Park is allowing potash mining inside its boundaries—on the condition that 90 percent of the potash be carried out of the small mine site by rail, which exists by now in a friendly natural balance with the environment.

The British know they are an island, that despite their own North Sea oil they are still dependent on the powerful nations that control the oil spigot, and that

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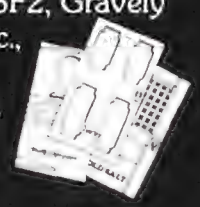

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A fantasy based on museum mummy room suggests another way to afterlife.

rail lessens their dependence. One ten-car passenger train with an emission-controlled diesel engine clears the highways of 400 passenger cars. British Rail has made a commitment to electrification to lessen its dependence: Oil must be shipped in, but that fortress made by nature has a rich foundation of coal under its surface, coal that is fuel for electric plants. Electric propulsion may be slightly less energy-efficient, but there is an abundance of made-in-Britain watts. Britain is banking on antipollution control technology to soften the effects of coal-fired electric plants that are proliferating in the country.

There are environmental, political and venal reasons for supporting a rail system, but the main reason is a belief in the basic right to mobility. The Briton believes in and has need of inexpensive, civilized travel. Cabs, buses and trains: They are expected to serve and serve well. During rush hours the buses and tubes (subways) are as full as British manners will allow and generally trains run moderate to full loads. The Briton, moreover, knows that his right to mobility is a service for which he pays in taxes as well as fares, but he has always been a willing subscriber.

There is, however, serious trouble ahead for British Rail. With the British economy shaken by increasing inflation, the railroad deficit has skyrocketed this year. It is certain that the need for econ-

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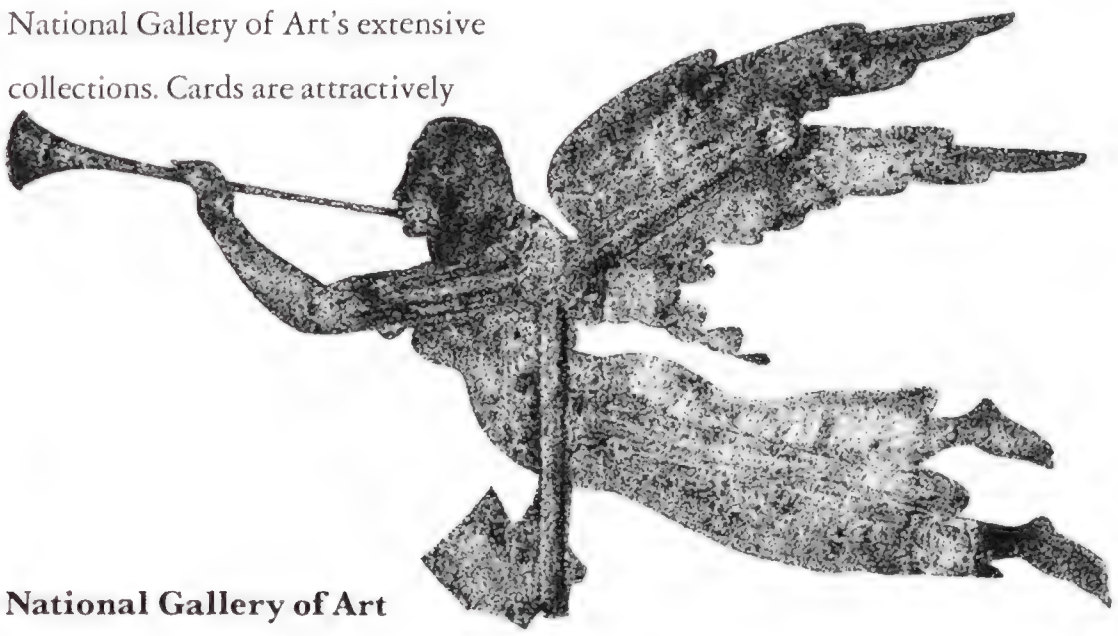

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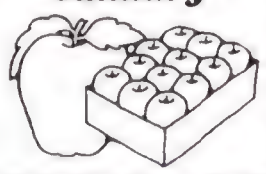
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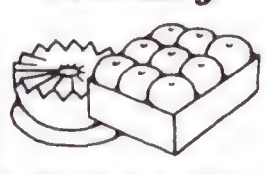
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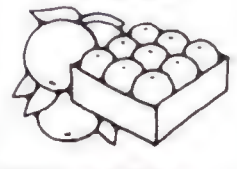
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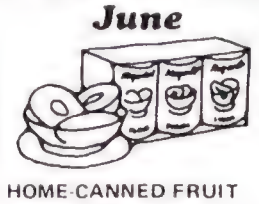
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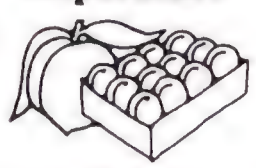
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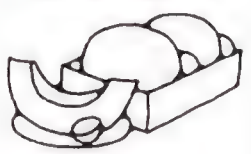
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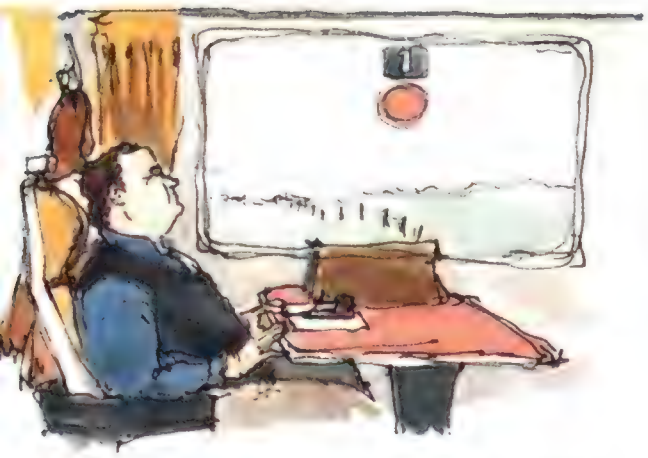
British Rail

omy will bring about further reductions in service—both in passenger and freight. *The Economist* recently chided the politicians for leaving the railroad men little maneuvering room in the business of fare increases and schedule reductions. It also chided the railroad men for not being businesslike. No doubt changes will be made, perhaps large ones, but the right to swift and comfortable travel is nevertheless unquestioned.

Paddington Station at 12:45 A.M. At a dimly lit platform the Plymouth sleeper breathes vapor in the chill. I board my car and present my ticket to the steward; he glances at the ticket number and quietly greets me by name. Would I care for tea or a drink in my room? No? Then have a good night. The compartment is small but fascinating, with tiny switches and glass-fronted drawers, fold-out hangers and a hidden washbasin under which

On British Rail one dines, rather than eats, but even here there are pitfalls.



Gentleman relaxes on first class smoker.

resides a clever self-emptying chamber pot only a little more sophisticated than the plumbing of Viola, Arkansas. Beside the mirror is a minute cabinet and inside, held by rubber-lined rings, are a British Rail tumbler and a bottle of "Schweppes (still) Drinking Water" with a script label like an engraved invitation. That makes up for the chamber pot. But the train is rolling, doing 20 mph before I realize we have begun to move, so gentle was the start. (The passengers who boarded and bedded at 10:30 would not wish to be awakened.)

And so, Mr. Pepys, to bed.

Plymouth station at 8:30 A.M. I leave the sleeper clicking softly at the platform and walk 50 feet to the car rental booth. They have a Cortina waiting and, sweetly, warmed up for me. Off to Exeter on the wrong side of the road. I could have taken the train, but British Rail rents cars, and this is a trip to explore BR's abilities. Right-hand drive is not so difficult, left-hand shift is perplexing, but they are nothing to the jolts of fear as you come back from a daydream wondering if you are on the proper side of the bloody road.

At Exeter I arrive, intact, drop my key in a slot, and walk another 50 feet onto the local for Salisbury. An older train this time, a diesel engine and vintage cars, but swept and neat and as comfortable as the newest. Under way, the steward comes through calling for the early lunch sitting, an invitation more than an announcement. The tables in the dining car are bright with white linen, flowers that quiver slightly with the train's speed, silver and service from several incarnations of British Rail, heavy and nicked and bright.

There is something essentially elegant about dining on a train—dining as opposed to "eating," which is what you do

water meter

Bloomin' good tool, this is! It's SAV-A-PLANT, a brilliant new instrument that instantly, accurately, *scientifically* measures soil moisture way down deep, where the roots are. Works indoors or outdoors . . . in plant pot, garden or lawn. There's nothing else like it on the market today!

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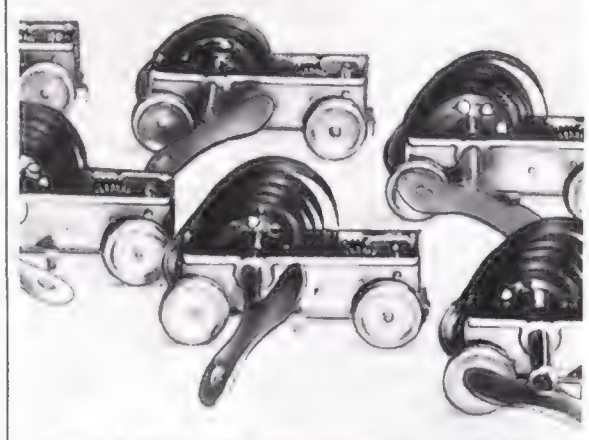

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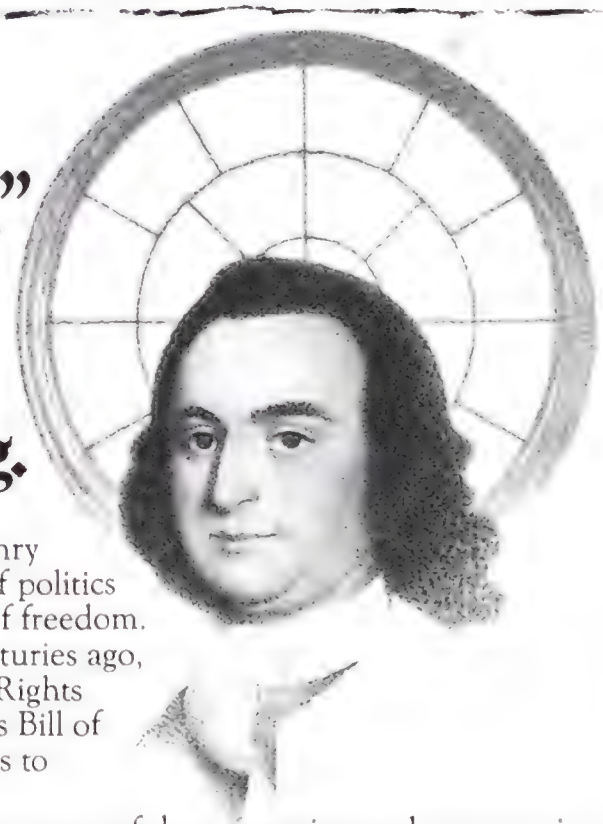

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British Rail

(or try to do with your elbows pressed to your ribs) on a plane. It is a paneled, well-lit room hurtling through lovely countryside for your luncheon entertainment, and always there is the feeling of the whole train, a linear village, a swift and jointed serpent out of a Swedish folktale, carrying you to a place of your bidding. Scotch trout poached, a salad, the ubiquitous brussels sprout, a good bottle of ale, dessert and tea: £1.50, which is hardly a king's ransom.

Salisbury, change trains. I cross the platform and wait 20 minutes. "Ladies and gentlemen," says a voice on the loudspeaker, "the 12:45 to Southampton will be approximately six-and-a-half minutes late due to track work. British Rail apologizes for the delay and inconvenience. Thank you."

Ladies and gentlemen, there are a

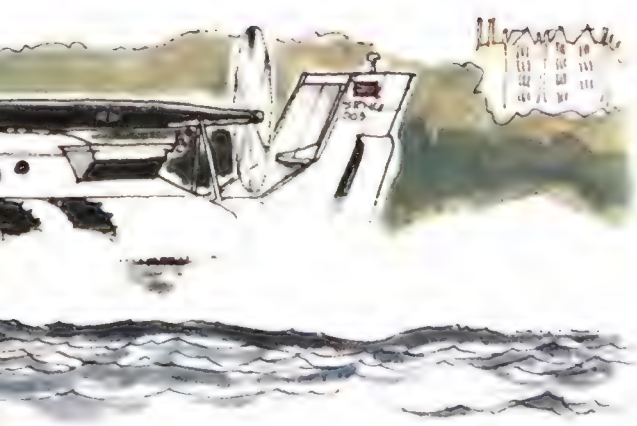
Hovercraft to Isle of Wight is noisy, inefficient—a favored British toy.

thousand reasons why British Rail transport runs well, but the underlying reason may be nothing more than good manners. Thank you.

Southampton: a 200-foot walk to the Seaspeed window, outside then to a waiting bus which leaves in five minutes for a short ride to the Hovercraft base. I walk into the ticket office. It has the thin-walled, over-windowed feeling of an operations shack on a Spitfire base. Out on the tarmac the big Hovercraft (65 feet, but not so big as the Channel model which carries cars and buses) is being tended by a ground crew. The personnel inside, though, are more Royal Navy than RAF: deep blue tunics with gold buttons and service stripes, full beards trimmed and brushed. We are waved on and board through the prow or the nose (one is undecided about aeronautical or marine terms for this illegitimate child of a Huey copter and a consenting PT boat). The turbines rev up, the black rubber skirt around the perimeter lifts, we can feel the slightly uneven burble of the air cushion, and the pilot (an interdisciplinary term) edges her down the ramp onto Southampton waters.

Sailors do not love the Hovercraft. It makes a noise like the moaning of the dragons. It consumes fuel at a gilt-edged rate and is of questionable use, but it is a proud British development, the kind of fascinating mechanical toy so loved by the folks who gave you the Industrial Revolution.

They say that when you can't see the



GENESIS XLIII 11. And their father Israel said unto them, If it must be so now, do this; take the best fruits in the land in your vessels, and carry down the man a present, a little balm, and a little honey, spices, myrrh, nuts and almonds:

We hope not to be considered sacrilegious for quoting from the Bible in our advertising. We do so to show how far back in history almonds were used as gifts . . . and to bring to your attention the fact that, despite the countless changes which have taken place through the centuries, almonds are still considered a valued and considerate gift.

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Isle of Wight, it's raining, and when you can see it, it's about to rain. They're wrong today, it is clear and brisk, the 200-yard walk to the bus stop is a pleasure. Rumbling around the corner comes a double-decker. The bus is inexpensive, I ride across the island for about 40 pence (96 cents).

Early in the morning at Ryde it is still dark and it is raining, now. The rain hits the backpack behind my hat brim with a hollow irregular sound. The Ryde station is brightly lit. Isle of Wight has its own railroad, Ryde to Shanklin, with hand-me-down electric cars from the London tubes. The train arrives from Shanklin, we board and ride to the end of the very long pier and step onto the ferry.

Across to Portsmouth, where the ferry nudges into a slip beside the platform for the London train perhaps 40 yards away. I board the train, an early commuter to London, talk to a few riders and, it being 7 A.M., sleep.

When I wake the run is full, seats and standing room, riders reading and conversing in the corridor, but this is just before we roll into London's Waterloo Station. Nine-thirty. The tube is too crowded to politely bring a backpack (British consideration is curiously infectious), but a Number 68 bus rolls up and drops me two blocks from my flat.

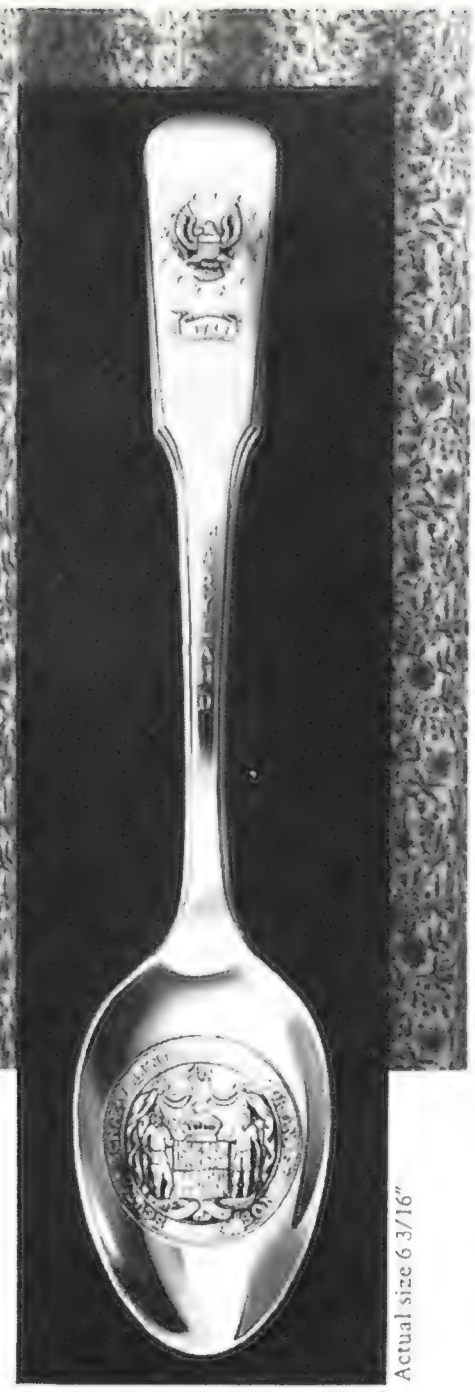
I have traveled over a large piece of England, a complex journey using many kinds of public transportation, all of them except the Isle of Wight bus a part of British Rail. Through the whole trip the system has worked. I have walked less than a quarter of a mile, I have dined well, I have slept soundly, and I have met

Young woman waits at Exeter for brief interval between connections.

—as always—people who were warm and friendly in the talkative atmosphere of the passenger cars.

Britain is a small island nation. New England and the Northeast Corridor will be as small, as population grows. Our land will be as precious, our fuel as scarce, our air and water and forests as threatened. The quality of our lives will be endangered. British Rail makes a considerable difference. American rail could, can, must.

At Salisbury author was thanked by a loudspeaker for his patience during 20-minute delay, leading him to idea that courtesy is part of efficiency.



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By Henry Lansford

Climate outlook: variable and possibly cooler

Climatologists disagree on whether the Earth is entering a cool period, but they agree that the outlook for agriculture is perilous

Climatic variability—droughts, floods and other anomalies—very probably will cause major crop failures in the next ten years. And, "if national and international policies do not take such failures into account, they may result in mass deaths by starvation and perhaps in anarchy and violence that could exact a still more terrible toll."

That is the conclusion of a meeting of experts in such diverse fields as climatology, agricultural economics and political science called by the International Federation of Institutes for Advanced Study (IFIAS), part of the Federation's examination of the impact of climate change on human life.

Government policies on agriculture and grain reserves generally have assumed that a relatively warm and stable climate is normal and can reasonably be expected to last indefinitely. This optimistic view is based on the experience of the first half of this century, a period when, in spite of some setbacks such as the dust-bowl years of the 1930s, climatic conditions were generally benign for agriculture in the great North American "breadbasket" as well as many other major agricultural regions of the world.

Until fairly recently most climatologists, accustomed to considering ice ages and other massive climatic changes that occur on scales of centuries and millennia, tended to agree that climate remains fairly constant, at least in terms of immediate human concerns. The average of the 30-year period between 1930 and 1960 was generally accepted as the climatic norm.

Skating on the Thames about 1684, a pastime not possible in recent years, dramatizes climatic change.

But now some atmospheric scientists are disagreeing emphatically with this complacent view. Reid Bryson, a climatologist who directs the Institute for Environmental Studies at the University of Wisconsin, describes the first half of the 20th century as "the most abnormal period in a thousand years" and maintains that our society has adapted to a climatic "norm" that is unlikely to prevail again any time in the foreseeable future. Bryson believes that the climate is changing now in ways that may have catastrophic impacts—"like a half-a-billion people starving."

Another atmospheric scientist who is deeply concerned about potential human impacts of climate change is Stephen Schneider, a physicist who is deputy head of the climate project at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. Schneider feels strongly that we must increase food reserves to prepare for unfavorable climate trends.

Even though we do not have certain knowledge that the climate is changing for the worse, Schneider asks if we can afford to gamble that we will not have a series of years like 1972 and 1974, when droughts, floods and early frosts drastically reduced crop yields. He advocates a food reserve policy that he calls the "Genesis strategy," after the Biblical book that tells how Joseph advised Pharaoh to store grain during seven years of plenty so there would be food for the people during the seven years of famine that followed.

What is happening to the climate? Is it in fact changing in ways that presage global catastrophe? If so, is it possible for society to prepare for the effects of climatic change and thus reduce their impact?

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Our uncertain climate (continued)

the Northern Hemisphere has been cooling off for the last quarter-century or so, especially in higher latitudes. This decrease in average temperature is slight—less than one degree for the Northern Hemisphere as a whole, and between four and five degrees for some northern locations such as Iceland. This cooling, which began in the 1940s and became more pronounced after 1960, followed a warming trend that had begun in the 1880s.

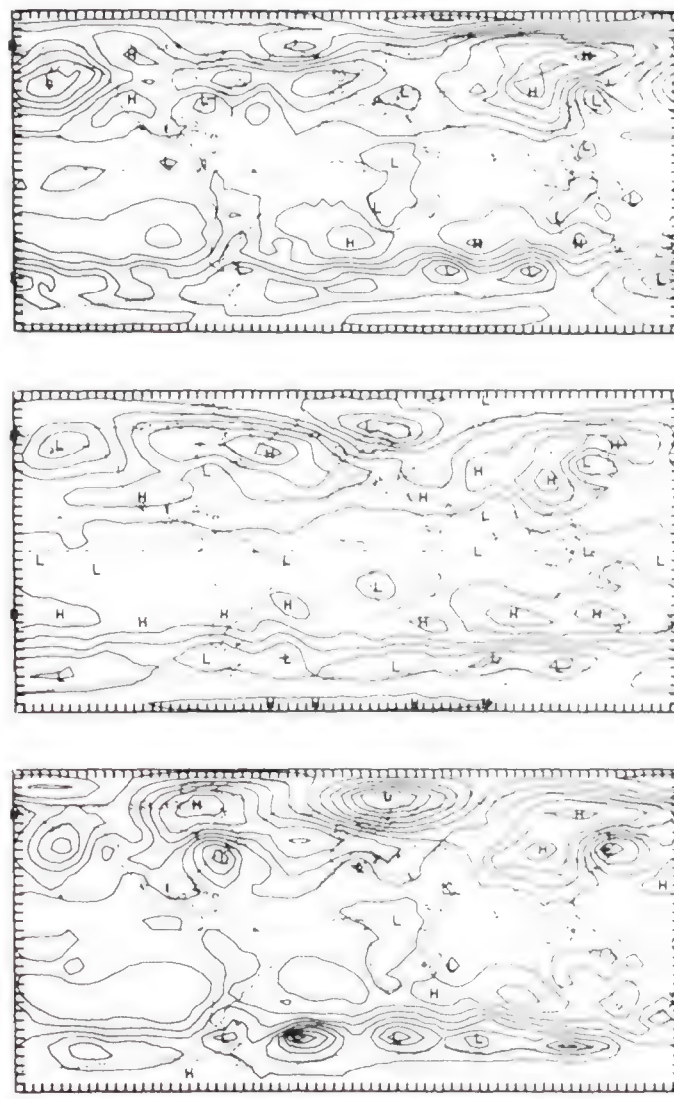
Although an average temperature change of less than a degree may seem insignificantly small, Hubert Lamb, director of the Climatic Research Unit at the University of East Anglia, has pointed out that the length of the growing season in England increased by two or three weeks during the warming period and has dropped back by about two weeks since 1945. In addition to the direct effects of the cooling, some scientists see evidence that it has caused greater climatic variability—more floods, droughts and freezes like those that plagued U.S. farmers last year. By increasing the temperature contrast between the equatorial and polar regions, this theory goes, the high-latitude cooling has altered the large-scale circulation patterns of the atmosphere. Bryson believes that this has produced a change in the summer position of the circumpolar vortex—the great band of high-altitude winds that circles the northern hemisphere—blocking the summer monsoons that bring life-giving rains to many heavily populated regions of the world. The sub-Sahara region of Africa known as the Sahel, which has suffered from severe drought over the past six years, is one of these monsoon-dependent areas.

Then there is the question of whether the cooling is a trend that will probably continue or a random fluctuation that is likely to reverse itself at any time. There are some recent indications that, at least in the North Atlantic region, the temperature may be starting to rise again. One school of opinion holds that trends like the warming and cooling during the last century must be viewed as fluctuations rather than climatic changes. As Helmut Landsberg of the University of Maryland puts it: "Atmospheric conditions as a whole, while mildly oscillating from year to year, have a fair amount of stability. They pendulate around averages that change only slowly."

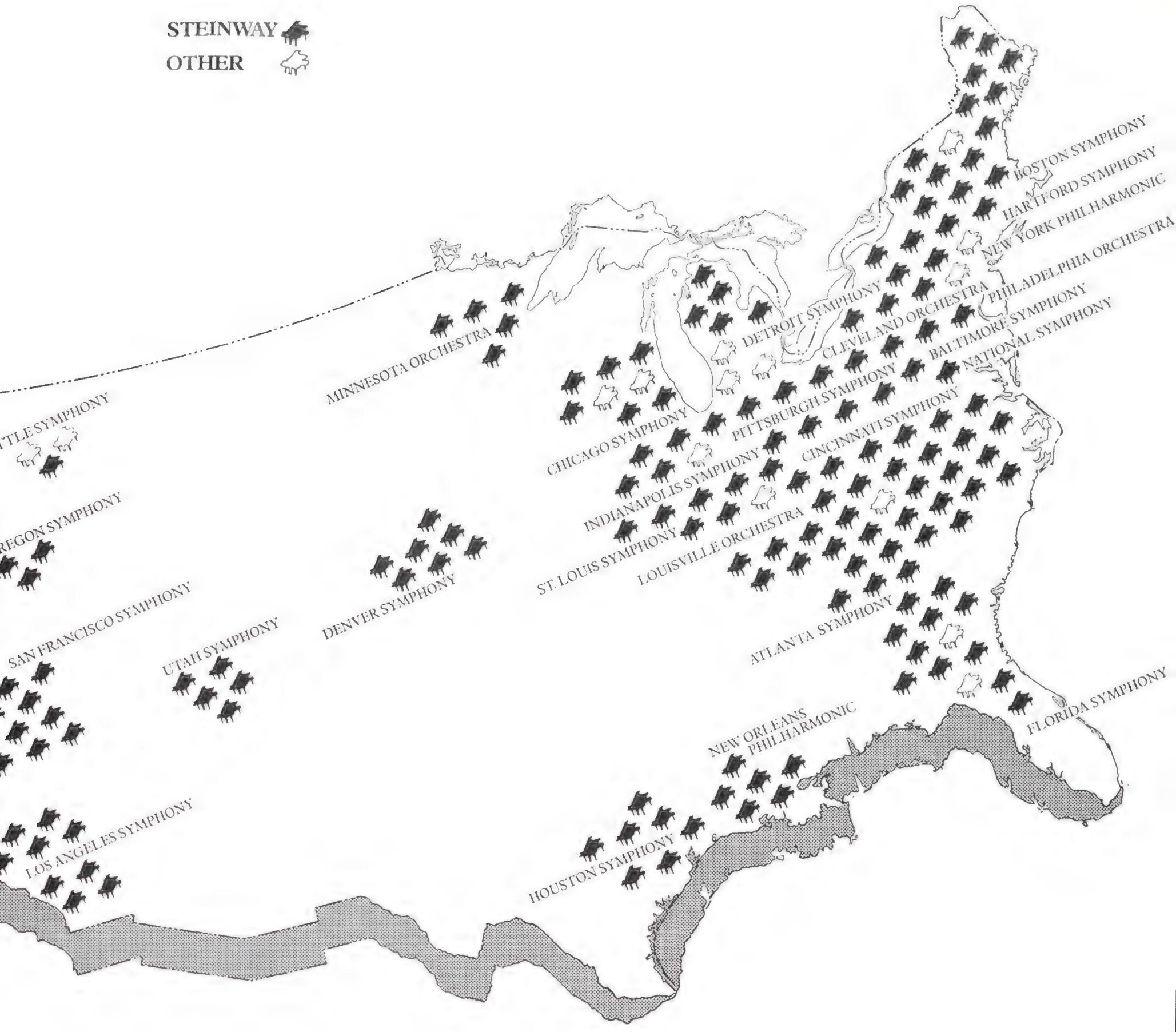
But other atmospheric scientists disagree. Walter Orr Roberts, who formerly headed NCAR and now directs the IFIAS climate project, describes the views of this second school like this:

"We feel that the downturn of temperature since 1950—and rapidly in the '60s—probably represents a trend and isn't just a short-term chance fluctuation, with next year or the year after likely to return to the conditions of the 1940s. We feel that it's more likely that these colder average temperatures in the Northern Hemisphere will continue for 20 or 30 years, and therefore we consider it a significant climate effect that the world will probably have to contend with for a long time."

We need to know more about the past to resolve the issue. Precise instrumental measurements of the factors that define climate—temperature, precipitation and



These weather maps are an exercise in numerical modeling of the atmosphere. Starting with real conditions at the top, they show the predicted conditions for 48 hours later and the actual conditions. The forecast was fairly accurate about the positions of the highs and lows, but it did underestimate their intensity.



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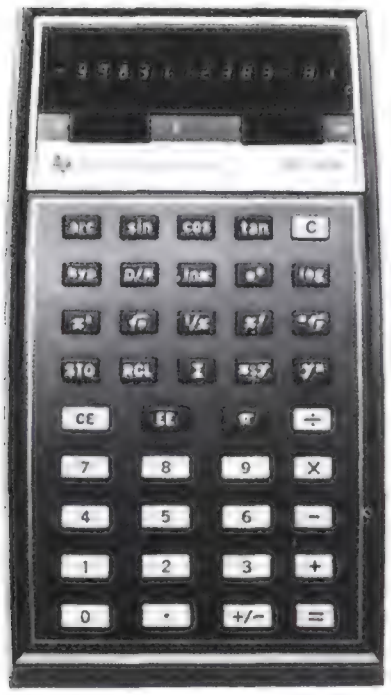

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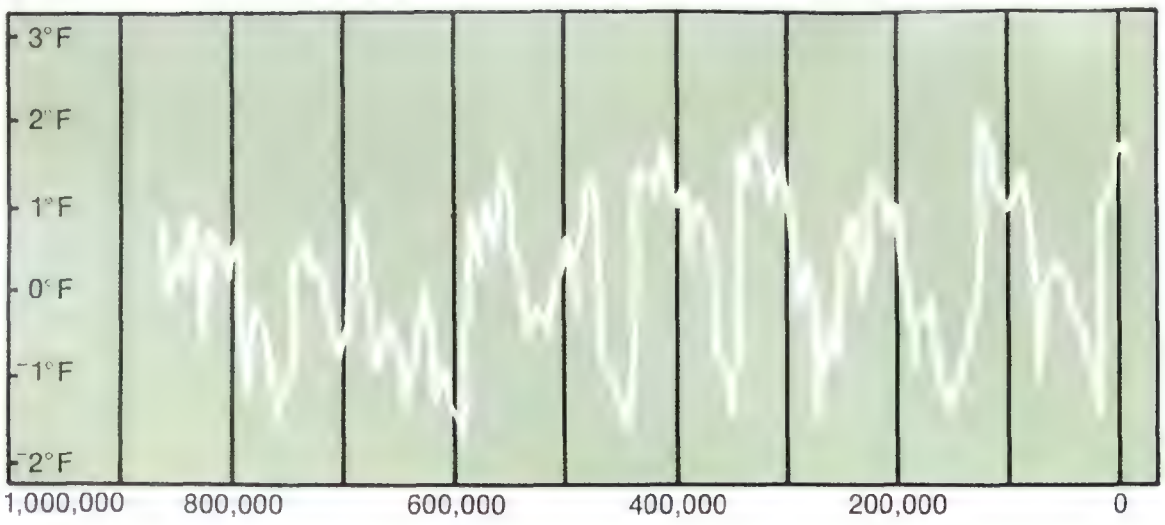

This curve (numbers across the bottom are years before present) shows cycles in average world temperature. Small changes make large differences in wind and rain patterns, and trigger ice ages.

others—are available only for the last century or so. Earlier climatic history has been reconstructed from such sources as tree rings, records of grape harvests in France, sea ice around Viking ports in Iceland, and contemporary references to events such as ice-skating on the River Thames, which has not frozen over in recent times. It is possible to trace climatic changes even further back into prehistory by using fossil evidence of pollens, beetles, oceanic organisms and other climate-sensitive life forms.

This paleoclimatological evidence indicates that, over the last million years, the Earth's climate has swung repeatedly back and forth between glacial and interglacial periods. During the cold glacial periods, or ice ages, ice sheets crept south over North America and Europe, and temperate forests gave way to frozen tundra over vast regions ahead of the ice. It seems fairly certain that about six of these cold periods have occurred during the past 500,000 years, and there is some evidence that the pattern goes back for several million years. During the interglacials, the climate grew warmer and the ice retreated poleward. Climatologists refer to our present epoch as interglacial.

The most recent glacial period started about 70,000 years ago and reached its maximum about 20,000 years ago, when an estimated 44 million square kilometers of land was ice-covered, compared with 15 million today. High mountain ranges were buried in ice, and a massive sheet of ice extended down from the Arctic across North America as far south as the present course of the Missouri River. Other regions were affected too, as great quantities of water were locked up in the ice and the level of the oceans fell.

About 15,000 years ago, the glaciers began to retreat. By 3000 B.C. the climate in the temperate zones was a little warmer than it is today. From about that time on, surprisingly enough, climate information is available from records that were kept deliberately and more or less systematically by humans. Chinese records are available for the period from about 3000 B.C. to A.D. 1000, and records from Europe are available after that. Increasingly detailed records have been kept since weather services were founded in many countries in the 19th century.

From a variety of European evidence, Lamb and others have called the cold period centered on the 17th and 18th centuries the "Little Ice Age." During that time, sea ice increased off the coast of Iceland, and farms that had been established in Greenland by Viking colonists were abandoned. Alpine glaciers, which had shrunk between A.D. 750 and 1200, began to grow again.

A French historian, Emmanuel Le Roy Ladurie, has studied Alpine glaciers carefully and has presented meticulously documented evidence that the glaciers advanced almost continuously between 1590 and 1850. In the last years of the 19th century, as the warming trend began that was to continue into the 1940s, the Alpine glaciers began a slow retreat. A comparison of mid-20th-century photographs with 19th-century engravings of glaciers such as the Argentière glacier near Chamonix, France, clearly shows the

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effect of the warming (page 151). In recent years, some glaciers show signs of a new advance.

Looking at the paleoclimatological records, climatologists generally agree that our present climate is considerably warmer than the average of the past several centuries, and that those centuries were warmer, and more ice-free, than the average of the past million years. It also appears that earlier climatic epochs as warm as the present one have been relatively short. This all suggests that we may reasonably expect a return to cooler conditions, but climatologists hasten to point out that the record of the past does not tell us when or how rapidly such a cooling might occur. Although the onset of warm periods generally seems to have been more rapid than the transitions to cold epochs, the most recent cooling trend, which began about 120,000 years ago, developed almost as rapidly as the warming trend that preceded it.

Many theories have been proposed to account for the alternating pattern of glacial and interglacial periods that characterize the Earth's past climate. Most fall into three main groups: Astronomical theories that attribute climate changes to shifts in the Earth's orbit or rotation on its axis; solar theories that propose that the Earth's climate varies in response to changes in the activity of the sun (SMITHSONIAN, September 1975); and geophysical theories that link climatic changes to events and interactions within the land-ocean-atmosphere system.

One geophysical factor that almost certainly plays a role in global temperature changes is the composition of the atmosphere. It has been pretty well established, by Lamb and others, that the climate tends to be cooler after periods of intense volcanic activity. The great quantities of ash and dust that are thrown high into the atmosphere by volcanoes can stay aloft for a long time, screening out some of the solar energy that otherwise would warm the Earth.

The opposite result, a warming trend, tends to accompany an increase in carbon dioxide in the atmosphere, through the so-called "greenhouse effect." Like the

Lansford, information director at the National Center for Atmospheric Research, is writing a book on climate.

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glass roof of a greenhouse, carbon dioxide is nearly transparent to incoming short-wave solar radiation, or sunlight. It is more opaque, however, to the long-wave radiation that is emitted by the land and the oceans as they are heated by the sun. Thus, an increase in atmospheric carbon dioxide would be expected to produce warming temperatures in the atmosphere.

Reid Bryson and other scientists have invoked these two mechanisms to explain the warming and cooling trends of the last century. According to this theory, carbon dioxide produced by the increased burning of coal, oil and other fossil fuels since the late 1800s caused the warming that continued through the 1940s. But at that point, smoke, dust, and other particulate matter from industrial smokestacks, slash-and-burn agriculture and other human activities reached such high levels in the atmosphere that their screening out of solar energy counterbalanced and then overrode the greenhouse effect, starting the temperature going back down. Many scientists doubt, however, that human influences on climate are as simple or as substantial as this suggests.

It seems doubtful that any single mechanism is responsible for major climatic changes, which appear to result from an incredibly complex set of processes, interactions and feedback mechanisms involving sun, atmosphere, oceans, land and ice. Many atmospheric scientists believe that the only way to understand climate change is through experiments with numerical models, which portray atmospheric features as equations that can be solved on a computer. Mikhail Budyko of the Soviet Union, William Sellers at the University of Arizona, and other climate researchers have used simple models of the energy balance of the Earth-atmosphere system to study climatic stability. Other modelers at institutions such as NCAR and the National Oceanic and Atmospheric Administration (NOAA) Geophysical Fluid Dynamics Laboratory have used models of atmospheric circulation to do climate experiments.

Although there obviously is more controversy over climate change than real understanding at this point, there is general agreement among atmospheric scientists that the human race is more vulnerable than ever before to vagaries of climate.

The basic problem is that population is increasing faster than food production, although the rate at which population and food are converging is not at all clear.

Regardless of the long-term prognosis, the immediate situation is precarious. As Walter Orr Roberts points out, both schools of thought on climate—the scientists who believe that a major climate change is occurring and those who see recent weather extremes as nothing more than fluctuations—agree that the high variability of climate presents a serious threat to food production.

"Climatic variability is very large in arid and semiarid lands," Roberts says, "and increasing population is accompanied by increasing use of semiarid lands. If you had a lot of really good agricultural land in the world and only needed to use 20 percent of it, then you could pick the 20 percent with the most stable climate. But when you've got to crowd onto every acre of the Earth, you obviously go into areas that have much more fluctuation and therefore your total crop yield is much more dependent on climate."

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Independence Hall is faithfully portrayed in fine detail. The full height of the bank is 10¼" and it weighs almost eight pounds.

Historical attention in 1976 will focus on Independence Hall, Philadelphia, Pennsylvania, just as it did in 1876, the year of our nation's great Centennial Celebration. This famous building was the site of the first public reading of the Declaration of Independence on July 8, 1776.

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The Bicentennial Bank is constructed of eight heavy iron pieces, each one individually sandcast in precisely the manner of the 1875 original. All pieces lock securely together with three nuts and bolts. The tower is removed by releasing one bolt for retrieving coins.

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land is a major factor in the severity of the impact of the Sahelian drought. As the drought advanced over the past six years, the carrying capacity of the land was strained beyond its upper limits by increases in the numbers of people and cattle on the available grassland. The result was destruction of vegetation by overgrazing, followed by starvation, malnutrition and disease.

A less dramatic but potentially more serious situation might develop in the Great Plains of the United States, where a great deal of the land that had been taken out of cultivation during the years of grain surpluses is now being farmed again. The semiarid plains west of the 100th meridian have suffered from drought every 20 to 22 years throughout the recorded history of the region. Although the causes of these periodic droughts are not understood, the next one is overdue if in fact they do recur on a 20-to-22-year cycle.

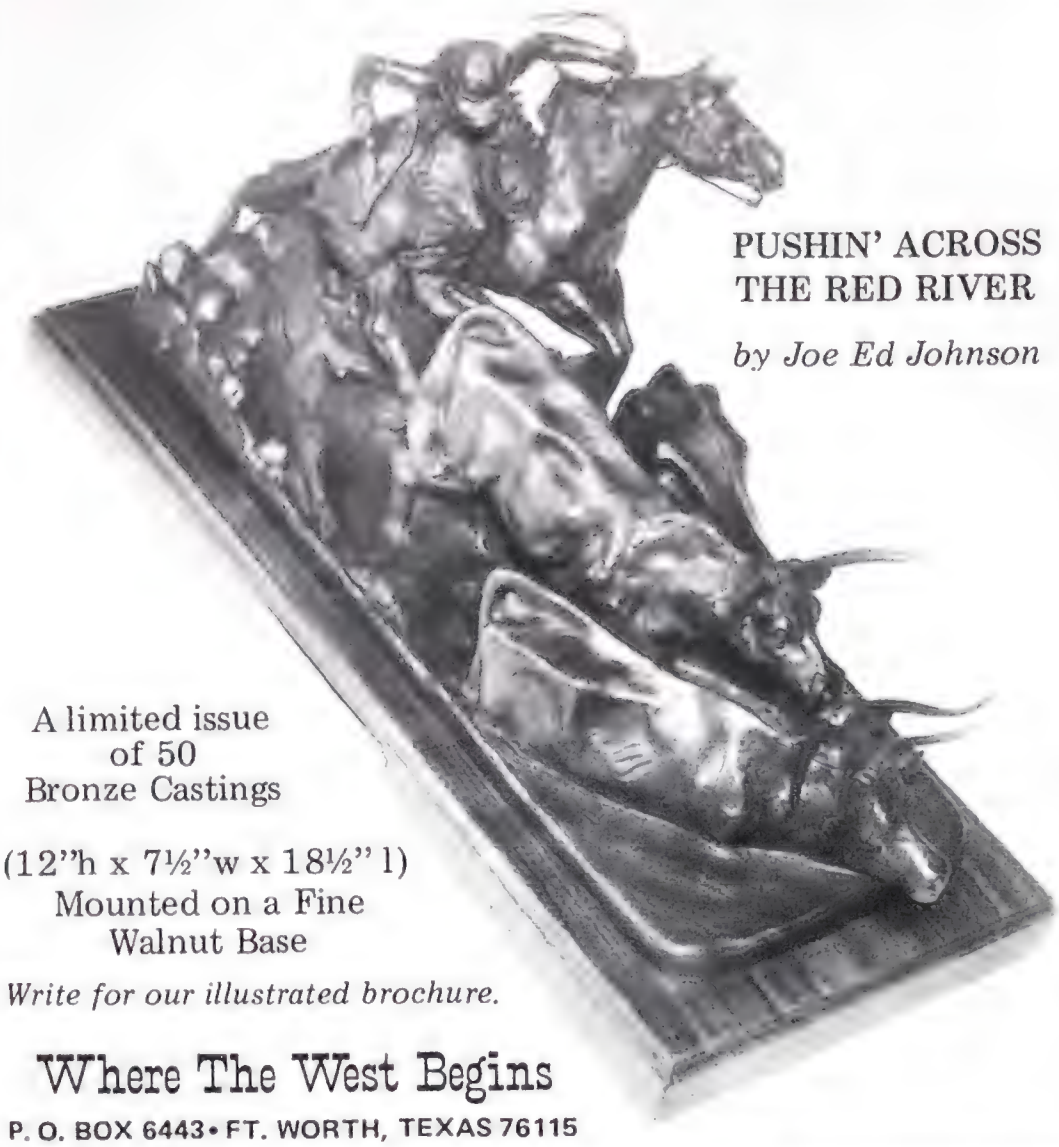
There also are important agricultural areas that are highly susceptible to temperature changes. Landsberg estimates that if the average temperature drops a degree or two in the region above the 40th parallel in North America, it could completely eliminate wheat and corn production in some major growing districts of Canada. However, such a cooling trend might also result in increased crop yields in areas further south where high summer temperatures are a limiting factor.

The climate trends that some scientists are predicting could bring us to a point of catastrophic convergence between increasing population and inadequate food supplies much sooner than many people expect. But even if no long-term changes in climate are forthcoming, the immediate potential for widespread famine appears to be deadly serious. World grain reserves are down to less than a 30-day supply. Several thousand people die each week from lack of food, and hundreds of millions more suffer from malnutrition.

It will not take an apocalyptic climatic event such as the onset of a new ice age to bring great human suffering from famine. As Addeke H. Boerma, director general of the United Nations Food and Agriculture Organization, puts it: "The chances of enough decent food for millions of human beings may depend simply on the whims of one year's weather."

In an engraving made about 1855, a glacier looms over Argentière, near Chamonix in the French Alps.

In a photograph made from the same spot 110 years later, the glacier has retreated up the mountain.



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Book reviews

The Backyard Wilderness: From the Canadian Maritimes to the Florida Keys
Vincent Abraitys
(Columbia Publishing Co. Inc., $10.95)
A Closer Look
Michael A. Godfrey
(Sierra Club, $14.95)

What makes a grown person weep for a passing bog turtle, pump adrenalin on sighting a siskin at the feeder, or defer to a clump of weeds? The answer may be in these books which give every living thing a cosmic significance and tell an exuberant story of hope and inspiration. The message is a fitting antidote for the steady diet of environmental alarms of our times.

Thoreau would approve of these modern apostles of the wilderness. Rather than curse Atlantic City, Abraitys marvels that Wilson's petrels still patter on the waves within a mile of it. He finds joy in the gradual northward advance of the cardinal and red-bellied woodpecker even while lamenting the gradual disappearance of the Muhlenberg turtle ("God help the turtle" as He helped the young Philadelphia naturalist, Gotthilf Muhlenberg, escape the British in 1777, he pleads). Godfrey ignores pollution and takes you gurgling along the bottom of your neighborhood stream in a Lilliputian traverse to face leeches and water snakes and crawfish eye to eye. Terrified to meet these denizens on their own terms, you quickly cop out when he lets you will yourself back to size. The ecological lesson is electrifying.

These are books about nature within reach. Abraitys' wilderness is the macrocosm; Godfrey's, the microcosm. Abraitys

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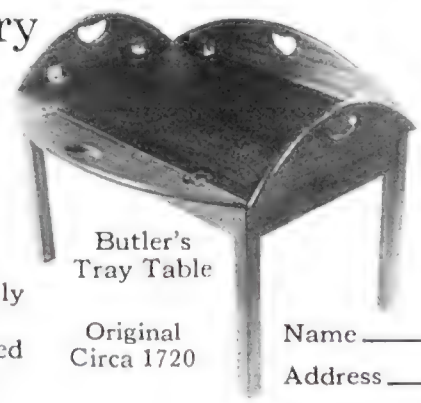

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puts the glass to the sea and the sky and the land and sees glorious diversity. Godfrey puts the scope to the flower or the stream or the dead snag and sees ecological intricacy, the high drama of pollination and predation or the mysteries of migration and seasonal change.

The Backyard Wilderness is six dozen short essays on the natural history mainly of New Jersey, especially Hunterdon County where the author grew up. His two great loves are birding and botanizing, but he ranges widely from wasp watching to rock hounding. Many of the essays, written over a 25-year period, first appeared in the *Hunterdon County Democrat*. Through the years, Abraitys expanded his "backyard" with forays north and south. Anyone conditioned to view New Jersey as merely a truck stop or truck farm between New York and Washington will be startled by this chronicle. From Cape May to the Kittatinny Mountains, New Jersey emerges as a naturalists's paradise even in 1975. Abraitys' diary is a lyrical tale of discovery.

A Closer Look probes deeply: Life on a Bull Thistle, The Stream, Spring Ephemerals, Plant Succession, Deadwood, Winter Birds, The Courtship of the Grasses, Caterpillars and The Ecosystem in My House. Its setting could be anywhere, but the author draws from his experience in the eastern deciduous forest, confessing a certain "Piedmont parochialism." A closely reasoned discourse, heavy with nuances, it is, nevetheless, readable throughout. Godfrey has orchestrated an ecological masterpiece, as fitting for the scholar in search of hypotheses as for the layman pondering first principles.

Abraitys and Godfrey are as different as they are complementary. Abraitys is a lister whose fun is in the finding; Godfrey's fun only begins with the finding. Abraitys can take a long day's journey from home to the Catskills and back and be content at having glimpsed a singing mourning warbler; or justify braving the frightening walls of Labradorean waters for the simple pleasure of sighting a skua. Happiness for Godfrey is deciphering a decapod, reflecting on grasses as more basic than oil (societies have made it without oil, never without grasses), or lying in bed in a lonely cabin decoding the chirping and skittering and contemplating the black rat snake's part in the household ecosystem as it disappears through a hole in the ceiling. Abraitys wants you

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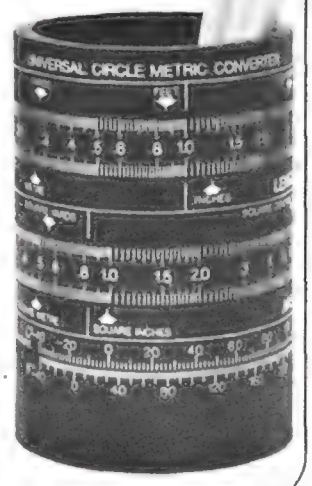

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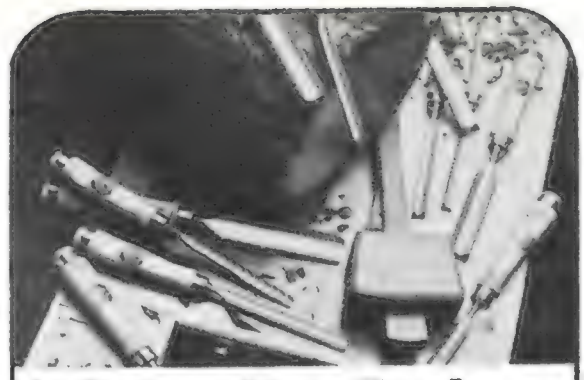

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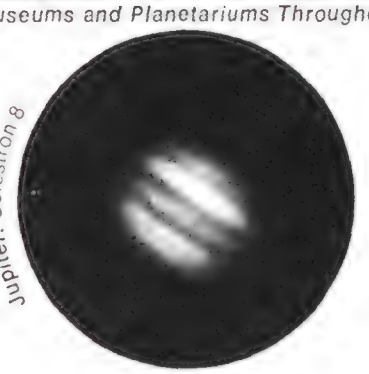
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to know; Godfrey, to understand. Godfrey challenges the intellect; Abraitys, the spirit. Yet both are romantics who inspire in their own ways.

Godfrey could use a few less adjectives, Abraitys a few more. The courage of both to avoid jargon is refreshing, but the teleology and anthropomorphism get a bit cute and contrived in places. Godfrey's world fits together almost too perfectly. Niches are worn on the sleeve and roles are played on a round stage without any back side. Either may read like a Russian novel to those unfamiliar with the names and places laced throughout.

Even the illustrations are uniquely complementary. *A Closer Look* is appropriately grand for a Sierra Club book, with spectacular color blowups of nature's intimate details. In *The Backyard Wilderness,* John Schoenherr's sensitive pen-and-ink sketches have the same lifelike quality and touch of magic as Abraitys' prose.

The wilderness dies when the sense of discovery dies. I have read no one who can keep the sense of discovery alive better than these naturalists. The books are at once scientific guides and spiritual almanacs. A conservation ethic and concern leaps from every page. Both authors are surefooted with the facts and, as good generalists, obviously have known when to commune with the experts. Whether rhapsodizing over a quiet pine barren (Abraitys) or the sex life of the grasses (Godfrey), neither lets his romanticism obscure his perception. Theirs is a gospel of holism and hope. Read them and you will forsake your duties to slog through a bog or contemplate a thistle.

—*Stanwyn G. Shetler*
Associate Curator, Department of Botany, National Museum of Natural History

To See Is To Think: Looking at American Art
Joshua C. Taylor
(Smithsonian Institution Press, $10)

Except for books on Picasso and Van Gogh, there are probably more books on how to look at art than there are in any other category. Here at last is the best in the field.

The reasons for the sheer excellence of this deceptively modest-appearing volume are numerous and subtle, but a basic one is simply that the author has not limited himself to the abstract discussion of what to seek and what to find in art, the quest

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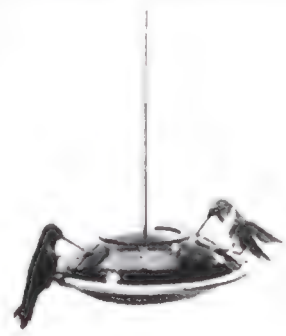

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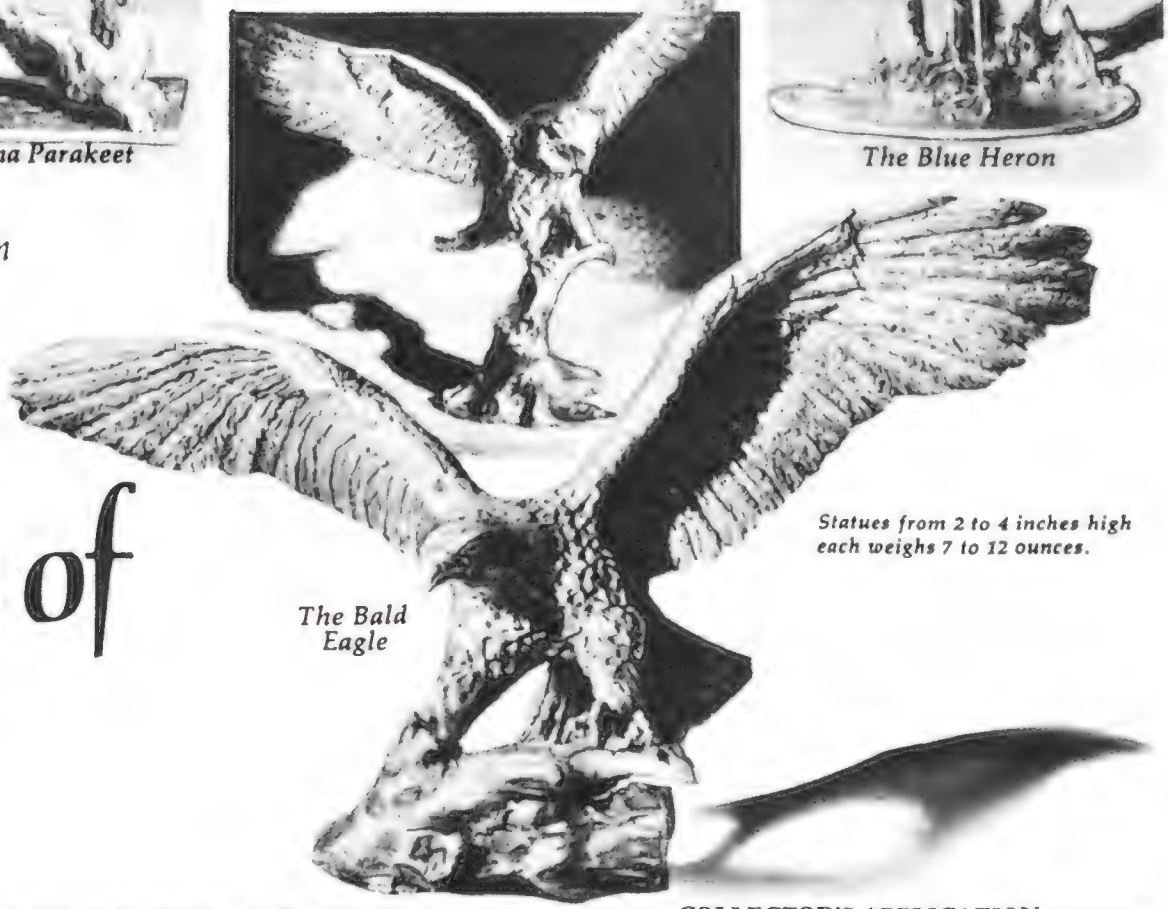

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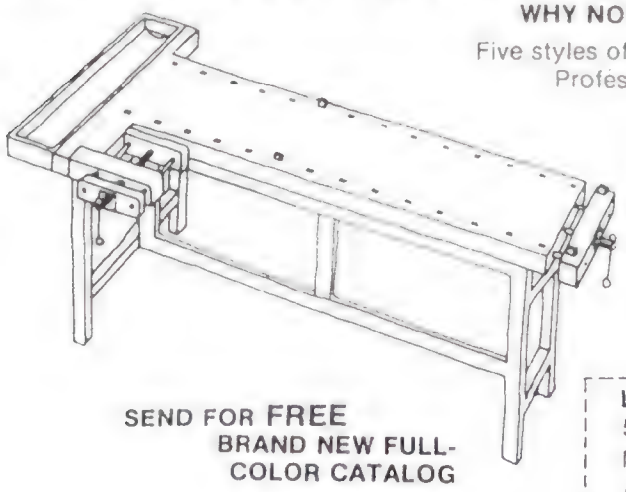

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illustrated by more or less appropriate pictures. He has done a number of other things at the same time, so that the process of looking is revealed along the way, almost as an aside, a manner in which quite a few things are best taught and best learned, among them the art of looking at pictures and statues.

The most obvious other thing he has done is to give an expertly guided, selective tour of his own museum. Taylor is the director of the Smithsonian's National Collection of Fine Arts. No one has ever seriously accused the NCFA of being one of the great collections of anything at all, including the 19th-century American painting that it more or less centers on. With little or no money for acquisitions over the years, the collection has depended on the charity of its friends, a collectivity with a taste at best erratic, at worst interested. It is a small institutional miracle that Taylor and his immediate predecessor, David Scott, have been able between them to extract the order they have from the hodgepodge they inherited.

The extraction of order from that collection proceeds in Taylor's book. Like any good museum director, he knows his own stuff better than anyone else and from it he has assembled a continually enlightening sequence of comparisons, contrasts, and illuminations.

Still another thing Taylor does in his pleasantly informal way is to back up developments of American painting with related, sometimes causative, developments in American or European philosophy, aesthetics and popular sentiments. Painting and ways of painting are thus placed for the reader in their proper intellectual context.

Yet, at the same time, they are treated as self-existent objects worthy of detailed examination and invariably yielding much more from such examination than the uninstructed eye could possibly expect. This, of course, is the very heart of the book, a heart that beats on every page and does so more efficaciously because it goes on within the view of American art and thought and within the review of works in the NCFA.

One great virtue is that Taylor not only accepts all art pretty much on its own terms, but has and therefore exemplifies the habit of seeking out its terms. The most extended examination of a single work, for example, is devoted to a John Rogers domestic statuary group, (SMITH-

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SONIAN, May 1975), illustrated by four photographs to show the roundness, the existence in 360 degrees.

Finally, beyond such details as the extreme care taken in the selection and reproduction of works and details to correspond with the text, Taylor's book is "the best" as noted above simply because he has no all-inclusive theory into which everything is fitted.

He believes, and persuades the reader to believe, that "art has regularly functioned in two quite opposite ways: to order the senses and bring the mind to a state of clarity and repose; or to arouse the senses and plunge the mind into an active, unending pursuit." Within that duality—encountered in so many other aspects of life—Taylor gives each work its individual due and shows again and again that this act of distributive justice has been amply repaid.

—Frank Getlein
Critic-at-large, *The Washington Star*

Thinkers and Tinkers:
Early American Men of Science.
Silvio A. Bedini
(Scribner's. Illustrated. $14.95)

> The time is now come, when the citizens of America should act entirely for themselves; when they should forever cease to depend on the caprices of foreigners. . . . The dignity of independence and the glory of usefulness should rouse the love of science from lethargic dispositions in America.
>
> Thomas Ewell, *Plain Discourses on the Laws or Properties of Matter . . .* (1806)

Simply stated, the impulse of this thorough and well-researched book is to give the lie to old Tom Ewell. The fact is that America and its colonists were nothing if not practical. For them, the "glory of usefulness" was no empty phrase. Early American scientists had little leisure for what we would consider "pure" or abstract research. Their daily activities forced them to adapt European inventions, refine them for use in a hostile environment, or else conjure up new instruments to meet the demands of colonial life. Thus, the first areas of science that received significant American contributions dealt with navigation, surveying and chartmaking. And the men who were to make these contributions were prac-

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tical, self-taught men who were forcing nature to give up no more of her secrets than would enable them to make a dependable landfall after a long sea journey, or to survey an accurate line between two rival territories. In the process, they created instruments and techniques that would benefit the entire world.

Early on, John Winthrop (1606-1676), son of the first governor of the Massachusetts Bay Colony, made studies of the agriculture of Indian corn and the process of brewing beer from corn bread. He also discovered on August 6, 1664, a fifth satellite of Jupiter (using the first telescope owned in the New World).

In his astronomical studies, however, Winthrop differed from most American stargazers, who considered themselves "practical astronomers" (in Jefferson's phrase) and regarded astronomy merely as an adjunct to their real interests, such as surveying or the design and fabrication of navigation instruments. Philadelphia's David Rittenhouse, a polymath who interrupted his lifetime of scientific work only to supervise the manufacture of gunpowder during the Revolution, said he was "so taken with optics, that I do not know whether, if the enemy should invade this part of the country, as Archimedes was slain while making geometrical figures, so I should die making a telescope."

Among other things, Rittenhouse was responsible for making the first practical application of spider silk for the crosshairs of surveying transits and telescopes.

Andrew Ellicott, whose knowledge of astronomy was regarded by Thomas Jefferson as almost a national resource, was actually a surveyor. In fact, Jefferson sent Meriwether Lewis to him to learn mathematics and astronomy, the better to map the Louisiana Territory. Earlier, surveyor Ellicott had designed an astronomical clock for field use that he would set up by felling a tree and using its stump for a table. But Ellicott's own field notes show how even the weather frustrated him: "Last night the weather was so extream cold that the Clock was stopped by the Oil losing its fluidity—set it going by my Watch—and took Equal Altitudes. . . . Cleaned the Clock and Oiled it with equal parts of Oil of Sweet Almonds and Olives—Olive Oil alone chilled with the cold and shortened the vibrations of the Pendulum—lowered the Pendulum Bob."

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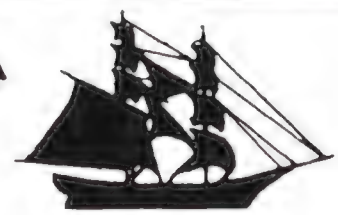

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WIRING INTO THE FUTURE

In 1949, George Orwell selected 1984 as a date safely far into the future for a setting of his ultimately "futurized" society. In 1970, Alvin Toffler gave us Future Shock as a concept to reckon with. Suddenly, 1984 is nine years away, and most of us in societies of advanced technology no longer have to wait for the "shock" of the future. FUTURE SHOCK IS NOW!

It is easy to read the signals of the past, hindsight hones your perspectives, but how do you get the precision of hindsight into foresight? The key objective of **Early Warning Weekly** is to make you a Monday morning quarterback before the game is played. **Early Warning Weekly** is a newsletter sent to you with the immediacy of Western Union's MAILGRAM, to inform you of the core data of the week's events . . . and to spell out insights, actionable alternatives you, your business, your family, your friends will so urgently need as the shocks, the crises and the dilemmas compound themselves.

Could the OPEC crisis, stagflation, the small car, the return of "classic" epidemics, the failure of the "Green Revolution" in agriculture have been foreseen? Could other courses have been charted? Who charted the courses taken? They were in fact predicted, but then as now unheeded by the real decision makers. According to a recent telephone survey conducted by **Early Warning Weekly,** staff planners are as reluctant as ever to discuss with top management the environmental and economic changes that may well affect the corporation's well being.

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We will defer to the conservative view. We seek to be always a *viable* stimulus. There will be a yearly directory of endorsed Futurist services and products. We will provide marketing assistance for Futurists' products and services. There will be *seminars,* tours to new towns, new concept industries, with appropriate specialists: Reston & Columbia with a city planner, sociologist, etc. In other words, Futurist's Action Research, publisher of **Early Warning Weekly,** also acts as a futurists' clearing house, offering subscribers such services as contact with key consultants in their industries, guides to research and data.

Now read these excerpts from a stunning article appearing in The Wall Street Journal, March 31, 1975, on the subject of Futurism:
By Liz Roman Gallese
Staff Reporter of The Wall Street Journal

". . . as many as one out of five of the 'Fortune 500' companies now have employees who 'play the genie in a practical sense, keeping firms abreast so they don't get caught short.'

. . . more and more companies will be hiring Futurists in the coming months as they try to brace themselves for the crises that have been catching them off guard in recent years—the energy shortage, wage and price controls, the environmental outcry . . .

Corporate planning departments of old are far from adequate today . . . Using economic data, marketing statistics and a smattering of demographic information, they merely estimated the profit potential of new products over a future of no more than five years . . .

Futurists, on the other hand, try to peer as far as thrity years into the future and bring a host of social and political factors to bear on a number of corporate problems. Usually trained as economists or market researchers, they are apt to be voracious readers who have an ability to develop contacts and to spot trends. Their function, though not yet formally named at many companies, is beginning to be called 'social and political' forecasting, 'environmental scanning' or 'early warning systems'. . . ."

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(focal length: 5½ ft.) with him on his field surveys. Unfortunately, it required the observer to lie on his back to peer through the eyepiece: "on account of the flies, and mosquitoes, which were so numerous, and troublesome . . . an observation which would require more than one minute, could not be made without great pain." Still, it was the only instrument in 18th-century America that could accurately trace a parallel of latitude.

Nevertheless, this bald recitation of the achievements of individual men does not do justice to Bedini's theme. According to Bedini, deputy director of the Smithsonian Institution's Museum of History and Technology, early American science was more or less a team sport and represents the combined efforts of many men, not just a few superstars.

What is appealing about *Thinkers and Tinkers* is the lode of scientific marginalia that Bedini mines for his readers. For example, Ben Franklin (who employed someone else to calculate the ephemerides for his almanac) included in 1732 a prognostication of the death of his rival publisher of almanacs, Titan Leeds. Leeds had no recourse but to take to the public press to denounce Franklin, a move that accomplished just what Poor Richard hoped: Three editions of Franklin's almanac sold out in just three months. All of which shows that Franklin knew English literature as well as he did science. Jonathan Swift had pulled the same hoax 25 years earlier. And Swift's prey, John Partridge, was forced to issue a pamphlet assuring the public that he was alive.

—*Michael Olmert*
Writer and critic

The Birth of the Talkies
Harry M. Geduld
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Movie-Made America
Robert Sklar
(Random House, $12.95)

"Wait a minute. Wait a minute. You ain't heard nothin' yet," were Al Jolson's first words in *The Jazz Singer* of 1927. They were as historic as Edison's recorded intonation of "Mary had a little lamb" 50 years before. Edison's words ushered in the age of the talking machine; Jolson's inaugurated the talking picture. The connection between these two events is scrupulously detailed in Harry M. Geduld's *The Birth of the Talkies.*

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At 20 he was the youngest person ever elected to the membership of the National Sculpture Society, and this year received the highest award of their annual New York exhibition. Working in his barn-studio in the rolling hills of the Brandywine Valley, he has found inspiration here for numerous works.

Brandywine Bronze takes great pleasure in announcing the first limited edition sculpture ever offered by Christopher Parks, *Calf-Bearer* and *Landenberg Shepherd.*

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Landenberg Shepherd with dog completes the collection (original clay in foreground of studio photo). Art historian Dr. Michael Richman says, "The *Landenberg Shepherd* is motionless, but beneath the wrinkled shirt and the baggy trousers, his old muscles tense as the pig squirms. The figure is flooded with numerous details to emphasize the mood and setting."

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Calf-Bearer, bronze, by Christopher Parks (actual height: 10 inches)

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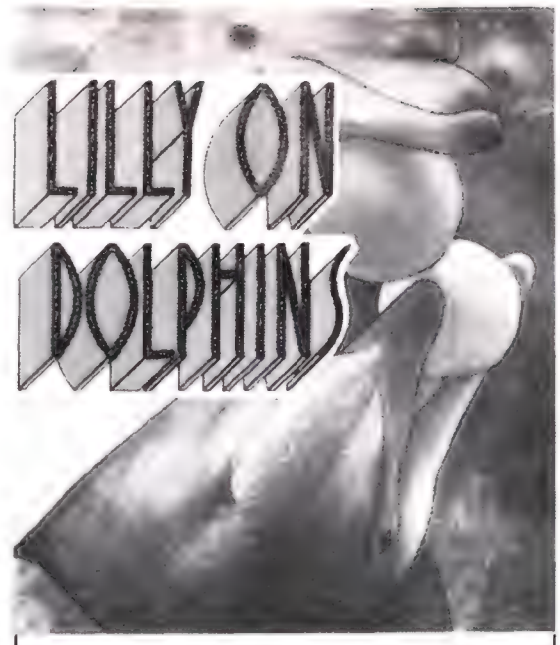
Once commercial movies became a fact of life at the turn of the century, inventors from all over the world (including Edison) attempted to unite the voice of the phonograph with the image on the silent screen. Their processes, patents, lawsuits, successes and dramatic failures were all a fascinating part of the long gestation period of the talkies. But the appearance of the talkies was not simply the result of technological progress.

Hollywood was initially hostile to the idea of moving pictures that talked, fearing the transition from silence to sound would be a very costly gamble, and perhaps ultimately the economic kiss of death to the industry. Still, they tempered their bravado by attempting to use the sound process as conservatively as possible, mainly to provide the musical background for essentially silent action. Al Jolson's own ad-libs, which were left in *The Jazz Singer*, were responsible for the more creative use of spoken dialogue.

The spectacular box office success of *The Jazz Singer* convinced the rest of Hollywood to invest in talking pictures. The technical innovation that had first to be weighed by the studio bosses had been accepted by the final judge, the movie audience.

Charlie Chaplin, Mary Pickford and Douglas Fairbanks clown around in course of selling WW I Liberty Bonds.

Who comprised the audience? Edison had predicted that moving pictures would provide home entertainment for the wealthy. He was wrong, Robert Sklar points out in his one-volume cultural his-



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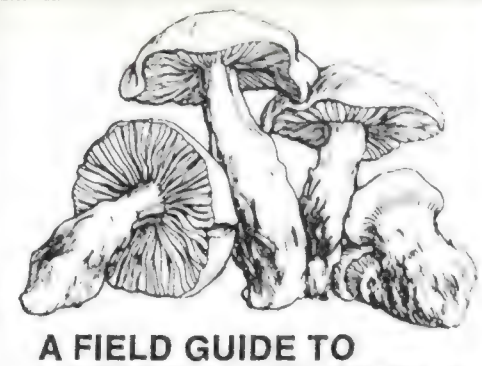
tory of the American film. From their beginning, moving pictures have provided entertainment for the masses and "have never lost their original character as a medium of mass popular culture."

From the days of the notorious nickelodeons that prospered in the slum districts of the big cities, movies, particularly comedies, were more iconoclastic, risqué, violent and vulgar than the standards of the middle-class cultural elite allowed. These very traits enhanced their popularity and their myth-making power. In its heyday, Hollywood was able to attract the middle class without losing its working class audience or its own, often madcap, point of view. But after the anticommunist crusades of the 1950s Hollywood became a reflection of the status quo. Its bland respectability caused it to lose its magical glamour and its ability to influence the values of the public at large. Hollywood's decline, according to Sklar, was not caused by the advent of television but by its own failure of nerve.

Movie-Made America is a book you will want to read. Every aspect of Hollywood from film making to film distribution, from Mickey Mouse to Linda Lovelace, is analyzed from a social and cultural point of view. The limitations of space at times squeeze Sklar into oversimplifications. He often discusses the middle-class opponents of the movies as if they were a monolith, and he deals with the stereotype of the Jewish movie mogul without adequately debunking the ramifications of this myth. Generally, however, Sklar handles his material with clarity and skill, adjusting it to his vivid if debatable point of view.

The Birth of the Talkies is a book you will want to refer to rather than read from cover to cover. It overflows with informative details which are not always subordinated to its main current. Some of the chapters sound as if they are expanded lecture notes, and they give the work the aura of a textbook. Geduld is a professor of comparative literature at Indiana University, where he has established a film studies program. Sklar is a cultural historian at the University of Michigan. The works of these academic authors paradoxically substantiate Sklar's idea that the decline of a mass audience for the movies of Hollywood has been matched by the rise of a new audience eager for books and courses on the film.

—Julia Markus
Washington novelist and critic



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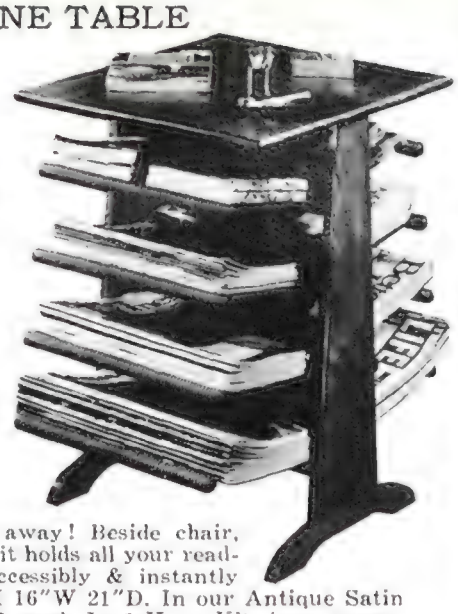

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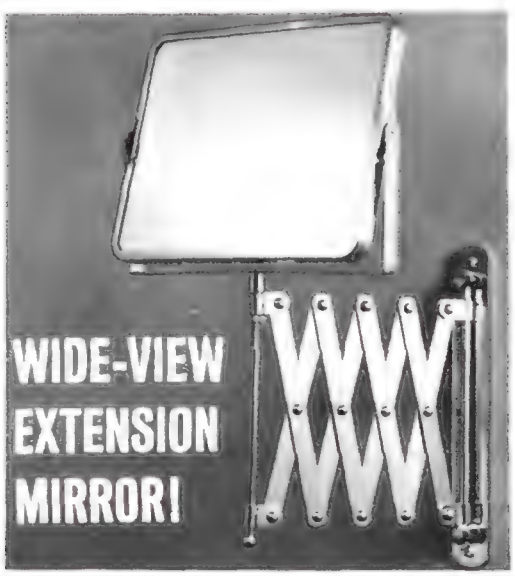

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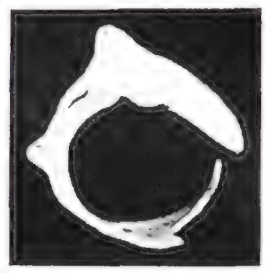

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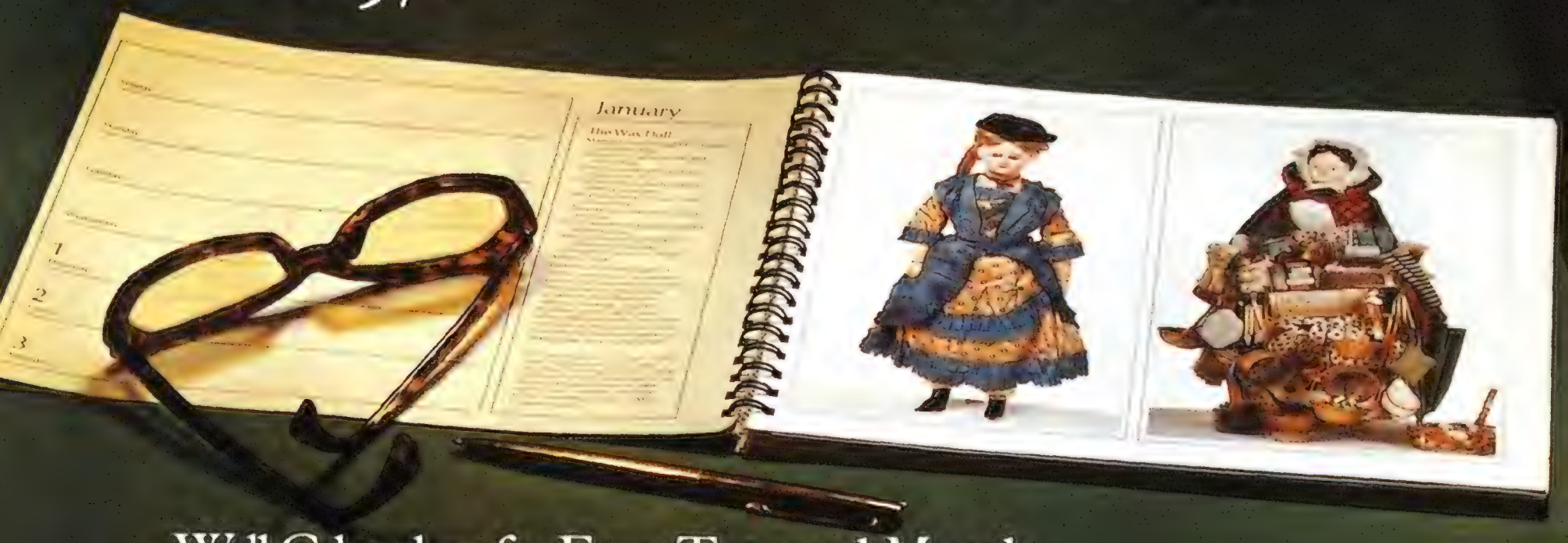

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Calendars are published for the Smithsonian by Universe Books, under the supervision of Museum staff.

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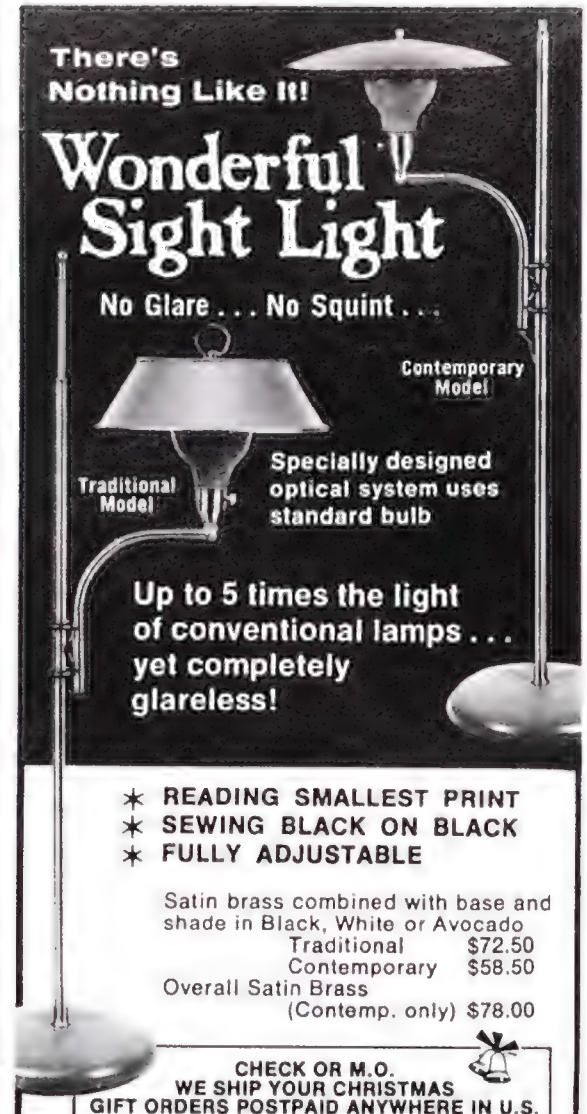
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Smithsonian highlights

New Benefit for Associates

The Smithsonian National Associates is proud to announce a "Regional Program" established especially for SMITHSONIAN subscribers. Its purpose is to bring exhibitions, live performances and lectures, representative of the diversity of the Smithsonian Institution, to Associates across the country. A series of November and December events have been planned for Associates in Dallas; Charlotte, North Carolina; Birmingham, Alabama; San Francisco; and Cleveland. Some of the scheduled events include:

- "Music and Dance from the Age of Jefferson," a historical theater piece produced by the Smithsonian's Divisions of Musical Instruments and Performing Arts, recreating the music and dance of an era through live performances, art works and lectures.
- "Art and the Written Word," a selection, portraying the history of the visual arts in this country, from the extensive collection of the Archives of American Art.
- "Sculptors and their Drawings," an exhibition assembled by the Hirshhorn Museum and Sculpture Garden.
- "The Crown Jewels of the United States," a selection of spectacular gems from the Smithsonian's collection.

National Associates will receive invitations to receptions and other events in their areas. We hope to bring the Regional Program to your community in the future. For information write: National Associates Program, A & I 1201, Smithsonian Institution, Washington, D.C. 20560.

Divisions of Performing Arts and Musical Instruments

- Music from Marlboro presents works by Villa-Lobos, Rossini, Carter and Beethoven, November 1, 5:30 P.M., Baird Auditorium, Natural History Museum.
- The Countsmen, a group of Count Basie Orchestra alumni, inaugurate the Jazz Connoisseur series, November 9, 6 P.M., Hirshhorn Museum Auditorium.
- The Lhamo Folk Opera of Tibet is featured in the People and Their Culture series, November 11, 8 P.M., Baird Auditorium, Natural History Museum.
- Music and Dance from the Age of Jefferson premiers in Washington prior to a national tour, November 14 at 8:30 P.M., November 15 at 2:30 and 8:30 P.M., Baird Auditorium, Natural History Museum.
- The American Banjo series presents Ralph Stanley and the Clinch Mountain Boys, November 16, 8 P.M., Baird Auditorium, Natural History Museum.

For information on discounts for Smithsonian Associates, students and senior citizens, call (202) 381-5395.

Fall Museum Hours

The Arts and Industries Building is closed for Bicentennial renovation. Other buildings are open daily from 10 A.M. to 5:30 P.M. The National Zoological Park is open daily from 9 A.M. to 4:30 P.M.

Group Tours

To arrange special group tours of exhibitions, Associates should call the following numbers (all in area code 202): National Portrait Gallery 381-6347; Museum of History and Technology 381-4141; Hirshhorn Museum and Sculpture Garden 381-6713; Museum of Natural History 381-6135; National Collection of Fine Arts and Renwick Gallery 381-6541.

Visitors Parking

A garage under the new Air and Space Museum is now open to the public. Parking fees are structured to discourage commuter parking and provide visitors parking spaces within easy walking distance of most Mall museums. Charges are 65 cents an hour for the first three hours and one dollar an hour thereafter. Entrance is on 7th Street, between Independence Avenue and Jefferson Drive, S.W. The Air and Space building will not open to the public until July 1976, but the garage facility is now open seven days a week from 7 A.M. to 6:30 P.M.

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National Collection of Fine Arts
"Christmas Seal Paintings 1975" presents original works chosen from the Christmas seal prize competition among elementary school children. Fifty-four paintings from each state, the District of Columbia, Samoa, Puerto Rico and the Virgin Islands are included in the show. Each work depicts a different aspect of the holiday season—opens November 14.

"Sculpture: American Directions, 1945-1975" is a diverse, selective review of important sculptural concerns and achievements from 1945 to the present. Sixty-three works by 54 of the most widely known sculptors, as well as others who deserve recognition, make up this major show. Pieces range from small, intimate sculptures to immense works. Among the artists represented in the exhibition are David Smith, Robert Morris, Dan Flavin, Reuben Nakian, Seymour Lipton, Robert Smithson, Claes Oldenburg, Joseph Cornell, Mark di Suvero and George Segal. "Sculpture: American Directions" will travel to various museums across the country after November 30.

Museum of Natural History
"South America: Continent and Culture" (see p. 32) is a new permanent exhibit hall portraying the varied resources of four South American zones—the grasslands, tropical forests, mountain valleys and arid coastlines. The exhibition demonstrates how different cultures have adapted to these geographic areas from prehistoric to colonial and modern times. The realistic effect of the exhibit is achieved through the use of murals, dioramas and artifacts.

Museum of History and Technology
The continuing exhibit in the newly constructed Hall of Political History is "We The People," a history of American government in three parts: "Of The People" asks who we are and have been in census, symbol and association with the rest of the world; "By The People" demonstrates how we campaign, vote and influence our government; "For The People" portrays the ways our system of government responds to the objectives established in the Constitution. Four cases of symbols with which the American people have chosen to represent themselves, such as the flag, eagle and Miss Liberty, line the entrance corridor of the exhibition.

Travel Benefits for Smithsonian Associates

With the growth of the Smithsonian Associates, the Institution is striving to meet the needs of its membership by offering a varied travel program. Traditionally, Foreign Study Tours provided culturally oriented, first-class, specialized trips under the guidance of museum curators or experts in respective fields. Then, Domestic Study Tours were added to offer similar opportunities within the United States, thus allowing Associates and their families a chance to combine vacation with a period of study. A year ago, Foreign Charter Tours were introduced; these trips are larger, lower-cost and more generalized in nature. Associates travel benefits are announced exclusively in SMITHSONIAN. Write addresses below for additional information.

Foreign Charter Tours

Mexico City and Yucatan—March 6-17: A study program in Mexico City concentrating on Aztec and Toltec cultures, followed by visits to the Mayan ruins of Chichén-Itzá, Uxmal and Palenque • **Australia**—April 10-May 2: "Lifeseeing" seminars in Sydney, Melbourne and Canberra, and excursions into the countryside; choice of side trip to Great Barrier Reef and Alice Springs, or Alice Springs overland to Adelaide, or trip through Tasmania and Southern Australia • **Eastern Europe**—May 6-20: Sightseeing and "lifeseeing" seminars during six days in Budapest; a hydrofoil trip up the Danube, visiting Renaissance and Baroque towns, followed by five days in Prague • **Soviet Central Asia**—May 9-24: See the battlegrounds of Alexander the Great and Genghis Khan; Islamic culture and architecture; visits to the cities of Samarkand, Bukhara, Tashkent and Khiva • **Russia**—May 20-June 3: The Bolshoi, Moscow Circus, Hermitage, schools, factories and housing in Moscow, Leningrad and Tallinn • **Great Britain**—September 16-30: The National Gallery, Tate, Victoria and Albert; walking tours of literary London and excursions in the countryside; the best of London theater • Low cost of tours includes first-class hotels, most meals, sightseeing, lectures, theater tickets and round-trip air fare from Washington, D.C. (Australia tour originates in San Francisco; Mexico and Yucatán trip originates in Mexico City). Foreign Charter tours are heavily subscribed, so write early for reservations and additional details concerning a specific trip to Smithsonian Associates Travel Program, A & I 1270B, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5910 for information.

Domestic Study Tours

Christmas at the Smithsonian—December 12-14: Fourth annual Christmas weekend includes an old-fashioned tree-trimming party in the Castle; special tours feature the Bicentennial exhibits • **A Weekend at the National Collection of Fine Arts**—January 23-25: A comprehensive look at American painting, sculpture and graphic arts in the United States from earliest times to the present • **Baja Whale Watch**—February 27-March 5: Gray whales, sea lions and birds from San Diego to San Benito Island, San Ignacio Lagoon, Cedros and San Martin Islands on a chartered sport-fishing boat • **Yellowstone in the Snow**—February 27-March 5: A survey of the wildlife and geography by snowmobile coach; accommodations at Old Faithful Snow Lodge • **Savannah and Charleston**—March 14-21: The history, culture and architecture of these two lovely Southern cities • **Washington "Anytime" Weekend**—Choose any weekend to visit the nation's capital and enjoy a special tour of the original Smithsonian building, two nights at the elegant Loew's L'Enfant Plaza Hotel, close by, and a chance to see other sights in Washington by Tourmobile; all-inclusive price is $59.95 per person based on double occupancy (reservations required ten days prior to weekend) • Write Smithsonian Associates Travel Program, A & I 1270B, Smithsonian Institution, Washington, D.C. 20560 for reservations or call (202) 381-5910 for information.

Foreign Study Tours

South India and Sri Lanka (Ceylon)—January 12-February 3: Caves, natural history and palaces • **South American Discoveries Voyage**—February 5-29: A cruise on the *Apollo*, with an emphasis on natural history. Beginning at Valparaiso, sail through spectacular fjords of the Chilean archipelago, following routes of Magellan, Drake and Darwin around Tierra del Fuego and Cape Horn, calling on shores of Patagonia, northern Argentina, Uruguay and Brazil, ending up in Rio at Carnival time • **Sites of Ancient Civilization**—April 2-25: The third cruise aboard the yacht *Argonaut* is between ports of Rome and Athens in the eastern Mediterranean. Under the leadership of distinguished scholars, the voyage is now expanded to include the ceremonies in Greece during Holy Week and an extended stay in Egypt • **Sicily and Southern Italy**—June 6-28: Archaeological sites and museums from Naples south, including complete circuit of Sicily, under personal direction of Dr. Richard Howland of the Smithsonian, architectural historian and classical archaeologist • Write Miss Bliss Schumann, Foreign Study Tours, SI 123, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5520.

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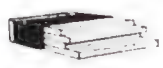

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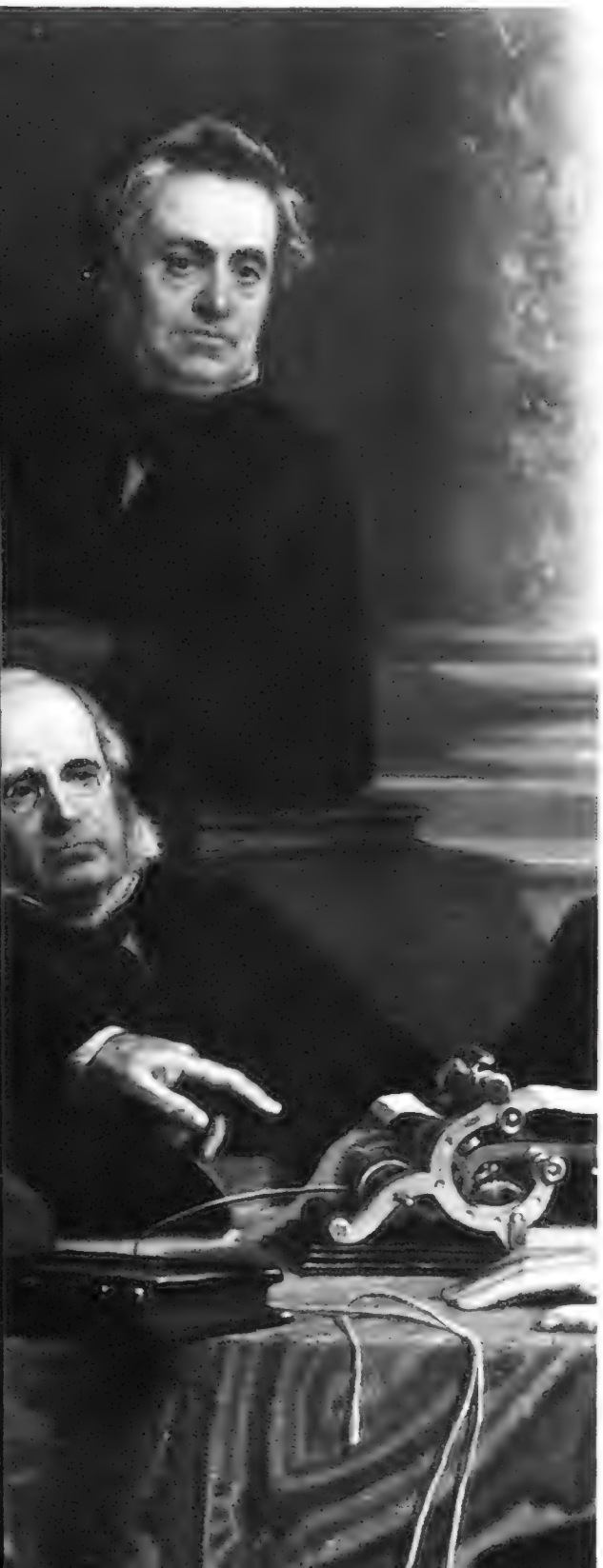
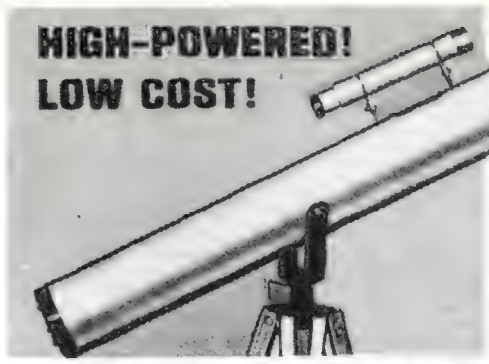
Detail from Erastus Bigelow's 1862 *Men of Progress*. There are 18 figures in the complete work. In this section, clockwise from lower right, are

mold the way America works, relaxes, studies, eats and lives—in short, what has now become known as the American way of life.

The exhibition is mounted in the newly reopened third floor of the Gallery. Once the largest room in America, the third floor space has been restored to its exuberant Victorian Renaissance splendor, a colorful combination of patterned stone, marble, tile, colored glass decorations and relief panels. For the first time since the disastrous fire in the building in 1877, this exhibit area is accessible to the public—opens November 14. For special group tours, call (202) 381-6347.

Jordan Lawrence Mott, Charles Goodyear, Peter Cooper and Professor Joseph Henry, who was the first Secretary of the Smithsonian.





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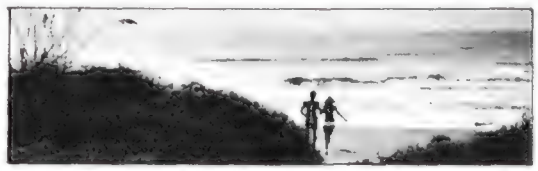

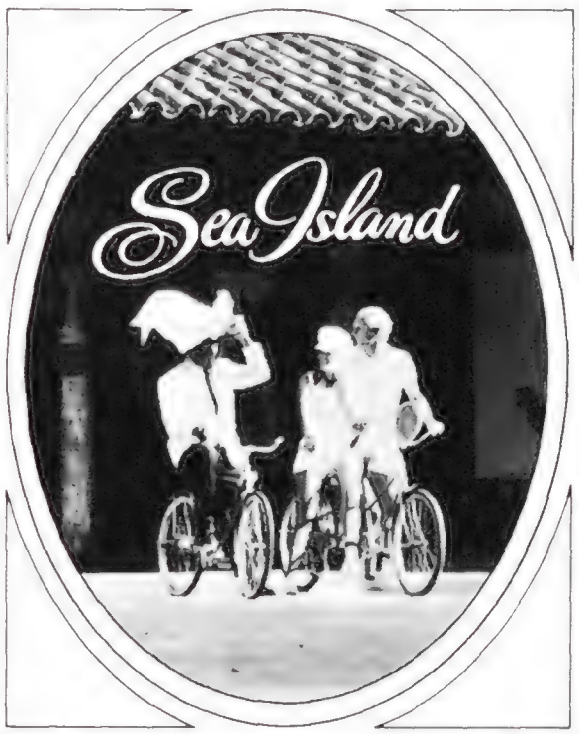

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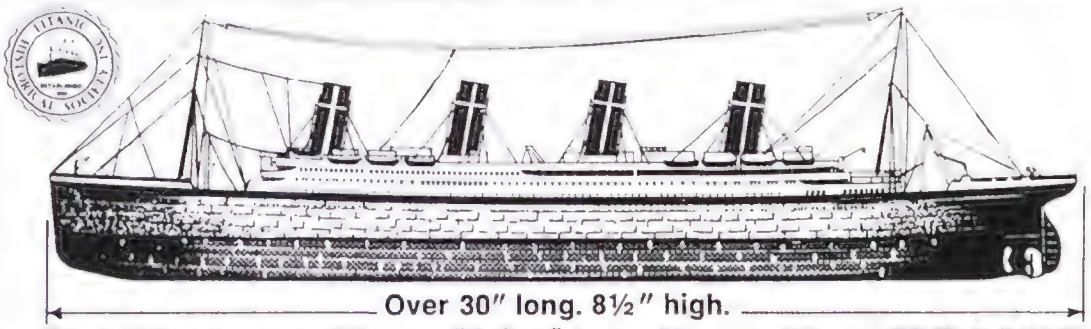

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By H. Allen Smith

The dictionary as myth or *The accent's all wrong*

For longer than 50 years I have been making my living as a professional writer and throughout that half century I have maintained a reverent attitude toward dictionaries. Each morning as I arrive at my desk, I all but genuflect before Webster's Third.

In my workroom I have five shelves loaded with assorted word books, not counting encyclopedias. Recently a professor friend, knowing of my predilection, sent me a Chinese-Japanese, Japanese-Chinese lexicon without a word of English in it. It weighed more than a country ham.

There are many mulish people who, upon being proved in error in the usage of a word, have said, "The dictionary is wrong! Dead wrong!" I once knew a bachelor newspaperman who lived in Greenwich Village and whose hobby was finding mistakes in the Encyclopedia Britannica. He'd check and cross-check and when he thought he had the error nailed down, he'd pace the floor of his apartment, flinging his arms aloft and crying over and over, "What dumb clucks! What duh-umb cluh-ucks!"

Up to now I have never argued with dictionaries or encyclopedias. The most recent addition to my collection is *The Trivia Encyclopedia*, which tells me that Pahoo Ka-ta-wah was Yancy Derringer's Indian companion on television and that the name over the door at Winnie-the-Pooh's house is "Mr. Sanders." I do not challenge these assertions.

Yet my whole posture changed a while back when I was reading Samuel Johnson, the man who put together the first adequate dictionary of the English language. Said Sam: "No dictionary of a living tongue ever can be perfect, since while it is hastening to publication, some words are budding and some falling away." A poorly wrote sentence, if you ask me, but the sense of it is clear.

I had to give fresh thought to the veneration I hold for the word books. I've been finding things to natter about. The modern fashions in diacritical symbols, for example. They don't seem to be the way they were when I was a schoolboy. I have looked into learned discussions of phonetic marks and I find talk of affricatives, ejective consonants, dieresis, nasality, tildes, lateral nonfricatives and other glottological chitchat.

I have the 13-volume Oxford and in its key to pronunciation are more than 60 phonetic symbols for the vowels and 23 for the consonants. I assume they are needed in England, where the dictionary-makers have to deal with people who say ebb-so-lootly, blost, chuhs! (in pubs), conweenience (a rest room), strawdnry, Hyah-hyah! (in Parliament), shed-yule, and oss (a beast of burden, or a bloke who is a booby).

Diacritical marks are ferocious and harrowing. To use a phrase from a girl I know in California, they bugger the mind. The phonologists have turned some of my favorite letters upside down, put tails on fs and js and devised markings that look like garden bugs and skinny sea horses.

When I was in school we had two, maybe three, phonetic symbols. They were the straight line over the *ā*, which meant it was pronounced as in *hay*. Then the dip, *ă*, which gave it the pronunciation as in *bat*. And occasionally, in those Midwest schoolrooms, we may have run into the Yankee umlaut, *ä*, which told us to say it as in *father*. That was it—all we needed.

In my present rebellion, I have abandoned all traffic with tildes and cedillas and breves and agglutinated dieresis and topside carets and double daggers and long-tailed fs and frail sea horses. We never heard such grandiloquent balderdash from Miss Nighswonger at Pugh School in Decatur, Illinois. We heard only *ē*, as in *me*, *ĭ* as in *it*, and *ă* as in *blather*.

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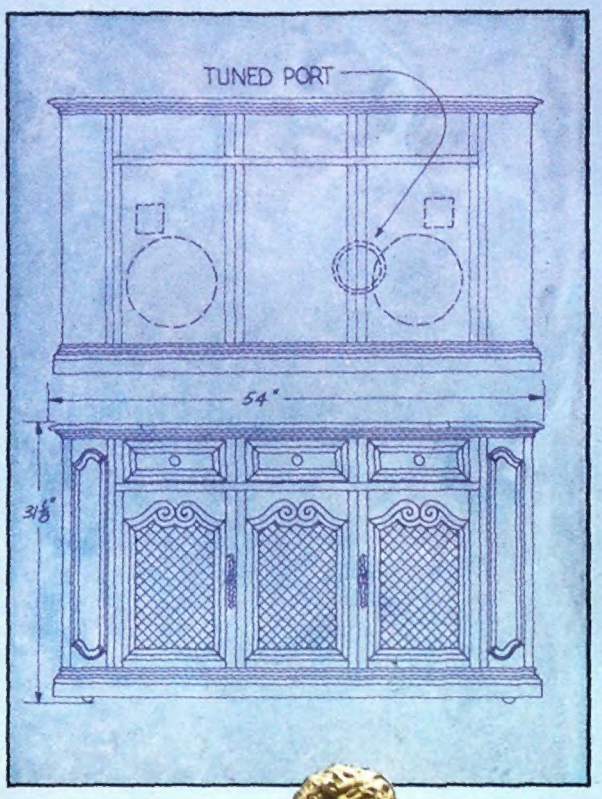

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